THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888

No. 44. NOVEMBER 15, 1947 Vol. 59

Wounds and Their Treatment*

By

J. G. WRIGHT

School of Veterinary Science, University of Liverpool

In a discussion on wound treatment I felt it would be unwise to limit its scope to our experiences with the recently introduced chemo-therapeutic substances and with penicillin, but rather to refresh ourselves with a review of the pathology of the processes of tissue repair and regeneration and of the factors which tend to retard or prevent them. The management of wounds is primarily a surgical procedure and irrespective of the antibacterial substances used, must be based on sound principles. It is well, frequently, to remind ourselves that the power of repair is an inherent property of all living cells and it is our duty as surgeons constantly to be on the watch for and remove retarding factors so as to ensure that the natural process of healing proceeds unimpeded. Despite man's great scientific advances, he still stands humble before this wonderful power possessed by simple living cells. It is a process of great complexity, yet one with which we are all so familiar that we tend to pass it by unobserved and unappreciated.

Repair in a wounded tissue proceeds with extraordinary rapidity provided nothing is present to retard it. An incised wound is covered by new epithelium in a matter of five or six days while a simple bone fracture is ensheathed in osteoid tissue in a similar period. To those concerned with the treatment of wounds, few sights surpass in beauty an operation wound healing by primary union or a wound cavity filling by healthy granulation tissue. Of the factors which interfere with such repair, invasion of the injured cells by pathogenic micro-organisms is predominant and from the viewpoint of our discussion to-day, invasion by pyogenic organisms. The distribution of such bacteria is ubiquitous, and there can be little doubt that all accidental and the great majority of surgical wounds in animals become contaminated by them either at the time of infliction or subsequent to it. You will notice that I have used the word contaminated rather than infected; the two are not synonymous for by the latter we infer that bacteria have invaded the cells and are multiplying in them. But the healthy animal body possesses an extremely efficient mechanism whereby infection is combated. Certain of the body cells possess the property of ingesting and digesting bacteria and dead material. The chief of these are wandering mesodermal cells—polymorphonuclear leucocytes—but fixed cells also, macrophages from the reticulo-endothelial system, possess this power in high degree. Thus bacteria which have entered the wound are devoured and removed; the toxins they have elaborated are neutralized by the blood serum and the fibrin which has been exuded in response to their irritant action is dissolved and the healing processes of granulation and regeneration quickly ensue. This is the outcome of the vast majority of wounds. The mechanism, however, frequently breaks down; infection is intense and tissue resistance is at first overwhelmed; masses of cells are invaded by bacteria and destroyed by their toxins and consequent on absorption of these toxins, the animal becomes ill. It may, in fact, in an extreme case, die from toxaemia or septicaemia. Much more often, however, after a lag of a few days, the defence mechanism becomes mobilized and the battle is on. An intense inflammatory reaction develops at the periphery of the lesion and necrosed cells are invaded by masses of leucocytes. These secrete enzymes which liquify the dead tissue and it escapes from the surface as pus. Slowly but surely the defences attain superiority; phagocytes ingest and destroy the bacteria; the blood serum acquires enhanced ability to neutralize toxins; pus formation ceases, the inflammatory reaction subsides and resolution by granulation and cicatrization proceeds. Sometimes the forces of invasion and defence reach an *impasse*; neither is able completely to overcome the other and a chronic inflammation often in the form of an ulcer, a sinus or a chronic granuloma, persists.

The course of an infected wound is influenced by many factors. The infecting organism may possess enhanced virulence as the result of rapid passage from animal to animal through the medium of such agents as instruments or animal houses. Conversely, the animal's defence may be weak. Infection is more likely to become established in aged and debilitated subjects than in young, vigorous ones. Resistance and speed of repair are also reduced by prolonged toxaemia and certain deficiency and metabolic disorders. I am quite sure you will all recall many personal experiences illustrating these points. I would remind you of your disappointment at the outcome of those hysterectomies performed in the dog and cat for pyometra or prolonged dystocia in which, consequent on the severe toxaemia present at the time, the combined factors of retardation of healing and infection were followed by breakdown of the wound and prolapse of the viscera. Certain tissues are more prone to infection than are others. Skin and mucous membrane, together with their underlying connective tissues and serous membranes, possess a high degree of resistance whereas structures of relatively low vascularity such as fascia, ligament, tendon, cartilage and the cornea, are more susceptible. Muscle is a highly favourable medium for bacterial multiplication because of its high glycogen content and this susceptibility is greatly increased if its blood supply is interfered with. To mention a few instances illustrative of these points: in the mare we perform the operation of ovariectomy by incision of the dorsal fornix of the vagina. To suggest that the manipulation is aseptic throughout would be ridiculous, yet provided it is performed expeditiously, healing is amazingly rapid without any indication of infection or the animal showing departure from health. This is not the outcome in an isolated case only; it is the rule and it contrasts strikingly with approach to the ovaries by incision of the abdominal wall. A further example is the rapidity with which the interior of the larynx heals after removal of the mucous membrane of the lateral ventricle, provided cartilage has not been interfered with. To take an example from the dog, I would quote the operation we perform for the relief of inguinal hernia. In this our interference is confined largely to skin, connective tissue and peritoneum, and an experience of several hundred cases has shown me that the almost invariable outcome is healing by primary union. I regret we cannot say the same of all our laparotomy wounds in that species. In the bovine, I would remind you of the high incidence of recovery from traumatic reticulo-peritonitis provided the foreign body is found and removed.

The nature of the wound is often the determining factor in infection. A grossly contused wound is much more liable to bacterial invasion than is a simple incised one, for a mass of severely damaged tissue, suffused with blood clot, is a most favourable medium and it is the factor which has made projectile wounds the subject of such intense study in war surgery. We, as veterinarians, have been fortunate during the two great wars in that the incidence of such wounds in animals was relatively low. Even during the 1914–18 campaigns when some three-quarters of a million horses were employed by the armies, the majority of wounds encountered were of the civil types—chafing by harness and saddlery and puncture wounds by nails and similar foreign bodies. It has been said that the cook's cart was a greater menace to the horse than was the enemy, for the fuel used so often comprised broken-up ammunition boxes from which the nails became scattered about the roads.

The outcome of a cutting operation often depends on the amount of tissue destruction incurred during its performance, and thus it is imperative that the operator shall ensure it is reduced to the minimum necessary to bring about the desired effect. The crushing of tissue by the application of forceps and other clamping instruments should be avoided as far as possible and, whenever practicable, muscle should be divided by blunt dissection in the direction of its fibres. Blood clot serves as a perfect medium for infection, and thus divided vessels should be closed by ligature and dead space occluded by appropriate suturing. Prolonged exposure of tissues often serves as the irritant factor which favours infection, and thus speed is essential. As an example of these points, I would mention ovariectomy in the cat. If the operation is performed quickly and precisely, first intention healing is the rule; whereas if consequent on inexperience the subcutaneous and retroperitoneal fat and abdominal muscle are subjected to prolonged exposure and bruising by forceps, sepsis is almost invariable despite the fact that the degree of surgical cleanliness has been adequate.

I am not a lover of local anaesthesia applied by infiltration along lines of incision for I believe the solution frequently serves as one of the irritant factors which favour the establishment of infection,

*At the meeting of the Central Veterinary Society held at the Royal Veterinary College, London, N.W.1, on May 1st, 1947.

and thus, whenever possible, adopt general anaesthesia or regional anaesthesia by the blocking of sensory nerves at a point distant from the site of incision. As an example, I would quote the operation of rumenotomy in the bovine. After considerable experience of it, I have come to the conclusion that the post-operative course of the abdominal wound is significantly better when paravertebral nerve block has been employed rather than local infiltration.

The course of an infected wound is often governed by the facility which exists for the escape of pus and tissue debris from its surface. If drainage is inadequate it is improbable that resolution will be complete. One of the first surgical rules to be learned is that there shall be free drainage from the most dependent part of an infected wound and if such is not present it shall be provided. It is the absence of such drainage which makes the deep puncture wound of such significance. Bacteria are implanted deeply and there is often considerable bruising. The minute skin wound is quite inadequate for drainage; in fact, it quickly becomes closed by bloodclot and scab, and an abscess develops. The course of the lesion will depend chiefly on its depth and situation. When subcutaneous only, the skin necrosis and sloughing which result from tension often, but by no means invariably, provide adequate drainage until the cavity has become occluded by healthy granulation tissue. Healing may be slow and the ultimate scar considerable consequent on the extent of skin destruction. At the same time nature has, in this way, provided her own means for restoring health. When, however, the abscess develops more deeply, it is improbable that natural resolution will occur and surgical interference is imperative. Pus under pressure, following the lines of least resistance, burrows along connective tissue spaces. Ultimately it may reach and burst through the skin, but the point of discharge is generally a considerable distance from the primary focus. Drainage is quite inadequate, infection persists and a sinus with a long and tortuous track often develops. This track may be in the vicinity of important blood vessels, nerves and other structures and its effective exposure by incision may be a difficult and even impossible surgical task. There is always the danger that a deep-seated abscess may eventually penetrate some important organ. Moreover, it provides a favourable medium for the development of *Cl. tetani*. The puncture wound of the horse's hoof is a classical example of the points I have in mind. We are all familiar with those cases in which infection, originally implanted in the plantar aspect, eventually bursts out at the coronary band, often involving the lateral cartilage before doing so. A similar lesion, the outcome of interdigital infection, is extremely common in cattle and comprises one of the important surgical problems of those of us engaged in country practice. Thus the surgeon must be acutely "pus conscious." The dictum of Celsus—where there is pus, let it out—is no less appropriate to-day than it was when uttered nineteen hundred years ago. Fomentations and similar applications may be of benefit in the treatment of simple and quite superficial infections such as the "boil" of the human subject, but they do not replace adequate surgical interference where serious infection is concerned. I would stress this point, for anything which delays adequate interference is bad.

It is appropriate to make brief reference to use of suturing in the treatment of accidental wounds. One cannot too strongly deprecate the tendency to close accidental wounds by primary sutures. To do so is contrary to all one's conception of sound surgery. I hesitate to think how many wounds which would otherwise have followed a relatively simple course have become involved in gross infection and sloughing consequent on suturing. Sutures may be harmful in several ways; the first and most obvious is that they tend to prevent the escape of pus and tissue debris from the surface of the wound; a second, that they themselves serve as an irritant which favours the spread of infection at the periphery of the wound, and a third, that the tension they provoke when the tissues swell in response to infection often causes considerable skin necrosis. The routine suturing of accidental wounds is a dangerous fetish which must be put in the correct perspective. Suturing is a practice to be adopted only after most careful consideration of the requirements of the particular case and then applied in such a manner that it cannot seriously retard resolution. In operative surgery, and particularly abdominal surgery, I regard sutures as a necessary evil; necessary to effect closure of the abdominal wall and thus prevent protrusion of viscera but evil in that they serve as a source of irritation facilitating infection. I have found in my abdominal work in cattle that the skin sutures almost invariably cause abscess formation if left in position for longer than five days, and for this reason I make it a rule that they shall be removed on the fifth day.

In human surgery, the organisms which infect wounds are classified as primary and secondary. The first are those implanted at the time of infliction of the wound and carried in with the object which caused it. They comprise aerobic bacteria of relatively low virulence together with anaerobes such as clostridia of the Welch group and tetanus. The source of secondary infection, which is often the more serious, is some other person who has subsequently conveyed it to the wound. Of these secondary invaders, haemolytic streptococci are the most important. The domestic animals are, I think, fortunate in that they are treated by members of a different species; it is unlikely that we are ourselves carriers of an infection to which animals are susceptible, and from our viewpoint the converse certainly holds. I recognize no such division of infection in animals. Wounds become contaminated at the time of infliction or subsequent to it by the common pyogenic organisms which have adapted themselves to the particular species. They seem to be everywhere and they are ready to invade whenever conditions are favourable for them to do so. In the equine species, the chief pyogenic invader is the group C. streptococcus of the Beta haemolytic division. *Staphylococcus aureus* is often present also, but when it is essentially concerned it gives rise to the typical chronic lesion of botriomycosis. Diphtheroid organisms are also met from time to time but I do not know their significance. In the bovine, *Corynebacterium pyogenes* is the most important wound invader. In the dog the picture is not very clear. My records indicate that the organisms most often found infecting wounds are *Staphylococcus aureus* and coliform bacteria. I have not found gas gangrene to be a common complication of either accidental or surgical wounds in animals. In reviewing my operation records in horses and cattle during the past five years, I find that in some four hundred relatively major interferences there have been four cases; two in horses and two in cattle. They occurred before penicillin was made available to us and all were fatal. The first horse was one in which the intestine had prolapsed after castration and considerable manipulation was necessary to return it, and the second, a bilateral cryptorchid which was subjected to considerable interference with the abdominal muscle. The condition developed in five days in the first case and ten in the second. Both the cattle cases were complications of rumenotomy and the organism involved was *Cl. oedematiens*. Evidence of infection was first seen five days after operation and death occurred in 24 hours. In a series of 60 rumenotomy cases, these two were members of a group of ten in which the method of suturing the rumen to the parietal peritoneum as recommended by Goetze, prior to incision of the organ, was adopted. They were performed under local infiltration of skin and muscle. I have formed the conclusion that the method was at fault. I think it probable that the infection came from the rumen and that anchoring it to the abdominal wall was a bad procedure. The local anaesthetic may have been a contributory factor. I recall when in Germany noticing that Goetze took elaborate precautions to protect the wound after operation, and on enquiry he informed me that his reason for so doing was the high incidence of gas gangrene he had encountered. I can only state that in 40 subsequent cases in which no such anchorage was adopted, I have seen no sign of anaerobe infection despite the fact that no external protection was applied.

The great advances which have of recent years been made in chemo-therapy have made collaboration between the clinician and the bacteriologist essential in order that the appropriate agent shall be used, but I would state that the sending of pus and exudate from abscesses and infected wounds to the laboratory has, like most other diagnostic aids, its limitations and by no means eliminates the necessity for a careful consideration of the clinical features of the case, for it is on these that action must finally be based. Among other things, I have in mind the relative frequency with which dog pus gives no growth on culture, yet it is quite clear from the nature of the case that severe infection is present. (A similar state of affairs is often found in relation to an inflamed mammary gland in the cow.) To illustrate this point I would quote a recent case:—

A two-year-old male spaniel had been ill for 24 hours with malaise, inappetence and stiffness of the hind limbs. At the time of examination, its temperature was 105·6°, pulse 120 and a painful, localized swelling the size of a hen's egg was deeply situated in the left inguinal region. The case was one of suppurative lymphadenitis. In the centre of the inguinal node a pus focus the size of a filbert nut was found. Swabs from the pus showed no growth on culture medium but incision and drainage of the abscess was followed by rapid recovery.

The possibility that infection is a specific one must be borne in mind, especially in chronic cases. *M. tuberculosis*, the organism of so-called skin tuberculosis in the bovine, actinomycosis and streptothricosis have all been encountered in sinuses.

But there are many other agencies which serve to interrupt the course of natural repair. They may act singly or in conjunction with infection. Tissue rest is an important factor in rapid healing, and if a wound is subjected to the irritation of frequently repeated movement, delay is inevitable. In the horse, for example, a relatively simple wound in a joint flexure may take many months to heal. The Winnett-Orr method of wound treatment by enclosure of the affected part in a plaster cast aims essentially at providing complete rest. We have adopted this treatment for compound fractures in

small animals and are satisfied as to its value. In the horse, however, wound treatment often presents great difficulties because of the impracticability of overcoming movement; the movement of locomotion, feeding, sinking to and rising from the ground.

The presence of a foreign body in the depth of a wound is well recognized as a source of irritation which prevents healing. In traumatic peritonitis and pericarditis in bovines, I regard the irritant effect of the presence of the piece of wire as being of greater significance than the bacteria it has carried with it from the stomach. It is of interest to note that in these cases *C. pyogenes* is often found in pure culture, and I wonder if we are right in assuming that the organism entered with the wire. There are other foci in the bovine body in which this organism is prone to multiply, yet we are uncertain as to the route by which it reaches them. Following this line of thought prompts me to remind you that functional disturbance of an organ is sometimes the factor which renders it a predilection site for pyogenic infection. In referring to it I am departing from the title of the discussion but I trust you will bear with me. The structural changes in the endometrium which result from irregular hormone function are probably the primary factor in the causation of pyometra outside the puerperal phase. Retention of urine due to obstruction of the urethra is quickly followed by acute infection of the urinary bladder. The bovine mammary gland is, of course, a law unto itself, but we must continue to enquire why it is that the functionless gland is especially prone to pyogenic infection during the summer months.

The application of destructive chemical agents in the treatment of a wound may be the factor which favours infection and prevents repair. The old-fashioned chemical disinfectants such as the salts of the heavy metals, the phenols and cresols, and the halogens, have little place in modern animal surgery. It is highly improbable, other than in very specific instances, that they kill bacteria in concentrations lower than those in which they injure living cells, and the essence of healing is that the activity of the cells shall be unimpaired.

But in saying these things, I am largely quoting the teaching of our distinguished guest, Sir Alexander Fleming, for I would remind you that long before his discovery of penicillin, he had profoundly influenced surgical thought by his studies of the toxic action of antiseptics on leucocytes. I well recall listening to him at the Royal Society of Medicine in the early 1930's, and I think he will be interested to know that veterinary surgeons have long been amongst his ardent disciples. Many of us had come to the conclusion that the chief part our dressings played was a physical one —the washing away of wound debris, bacteria and their toxins—and thus normal saline solution was the best in that it was a non-irritating and non-toxic physiological fluid. It had the disadvantage, of course, that it was neither colourful nor smelly; I have little doubt that not the least of the attractions of many of the popular antiseptic solutions are colour and smell: the milky purity of the cresols, the brilliant yellow of the flavins and the attractive odour of the terpines. In man, of course, the fact that a dressing hurts, as does iodine, is an added advantage. It is not without significance that it was the man who made such a close study of the natural defences of the body and who did so much to put our views in regard to wound treatment in the proper perspective, should be the one to discover the greatest antibacterial agent yet known to science. With his deep distrust of chemicals and with his very exacting methods of assessment, it could be taken at once that penicillin was something of exceptional value.

In assessing the clinical usefulness of the newly introduced forms of wound therapy, we must constantly refer back to the results which were obtained prior to their introduction, in order that enthusiasm shall be curbed and overstatement checked. On doing so we find that the great majority of accidental and surgical wounds in animals ultimately healed. I say ultimately, because while a high proportion of them became infected with pus-producing organisms, such infection (in the absence of some other retarding factor) was generally temporary, and the tissues soon gained ascendancy over it. Moreover, with improvements in technique, and with a greater appreciation of the rationale of wound treatment, the delay from this cause had become reduced. I stress this point because of the difficulty of accurately assessing how far a result is ascribable to the treatment adopted and how far it is natural. In field work it is impracticable to carry out controlled experiments; no two animals are the same and no two wounds present exactly the same features. Even in the same individual the results of bilateral operative procedures seldom follow an identical course. Thus in referring to the new forms of therapy I propose to confine my remarks to operative procedures, the post-operative course of which was well defined and, in general, unsatisfactory, and to very severe cases in which death was the likely outcome and make comparisons between the old methods and the new. Firstly, the sulphonamides. Of the pyogenic organisms, the haemolytic streptococci are most susceptible to bacteriostatic action of these drugs. This statement certainly holds true for the more simple and less costly members of the group. As the common pyogenic invader of the horse is a streptococcus, we were at once hopeful that sulphanilamide would prove a useful wound dressing, and I would say at the outset that in my opinion, we have not been disappointed. To assess the value of the drug, I have selected the post-operative course of the radical interference we perform in the treatment of so-called fistulous withers and poll evil. I think you will agree that in the past it was unsatisfactory. Gross infection with severe inflammatory pain and profuse suppuration were the rule. You will all recall horses that had to be forcibly restrained in a trevis in order to carry out dressing, and some in which even approach in the stable provoked fear and apprehension; to touch the animal anywhere in the region of the lesion was a risky procedure. The whole gamut of antiseptic treatment was explored; frequent irrigation with eusol and flavine, packing with eupad and B.I.P.P., and so on, but there was no significant alteration in the degree of infection. Many held the view that copious irrigation with water from the hose pipe was the best treatment. The percentage of cases in which complete healing ultimately occurred was very low. In my experience, the introduction of sulphanilamides has completely changed this gruesome picture, for provided one's surgery has been adequate, and this proviso is a *sine qua non*, and one can repeatedly bring the powdered drug everywhere into contact with the cut surfaces, infection is controlled, excess inflammation and pain are absent and healing is relatively rapid. The secret of success is that suppuration shall be controlled throughout, for as you know, the presence of pus inhibits the action of the sulphonamides and to continue with them in its presence is generally futile. If suppuration develops it is an indication that a sinus persists and that there are areas with which the drug is not making contact. Such an eventuality necessitates further cutting. Early in 1946 I recorded 18 cases which had been treated in this way and in which recovery had occurred in 60 per cent. Since that time I have operated on 12 more cases with the same percentage of recovery. Unfortunately, there are relatively few equine operations in which it is possible effectively to apply daily dressings because of their situation. Much of our surgery is performed on the ventral aspect of the body; cryptorchid castration, operations for scrotal, inguinal and umbilical hernia. They are interferences which are often accompanied by marked post-operative infection with inflammatory swelling, oedema and some systemic malaise. My practice in these is thoroughly to powder the whole of the exposed area on completion of the operation. It is not possible effectively to re-apply the drug with the animal standing. While here I am not on anything like such sure ground, I give it as my impression of a large series of cases that by such treatment infection has been inhibited for about 48 hours and that healing has been accelerated thereby. We have used two sulphonamides for the purpose—sulphanilamide and sulphamezathine, and again it is my impression that a single dressing of the latter retards infection for a longer period than does the former. I would quote the roaring operation. In this our practice is to powder the skin and muscle incisions with sulphamezathine at the time of operation and subsequently to wipe them daily with a little normal saline and reapply the drug on the finger. In the last ten cases no treatment has been necessary after the eighth day by which time the animal has been ready for discharge from hospital. My belief is that the rate of healing is significantly faster than it was before the use of sulphonamide.

In the treatment of operative wounds in cattle, I have long been of the opinion that sulphanilamide was valueless. It has since been shown to have little action against corynebacteria. The operative procedure selected for assessment was amputation of the digit. You are all familiar with the lesion which necessitates the operation. *Fusiformis necrophorous* is often incriminated, but my experience has been that swabs taken from the lesions reveal *C. pyogenes*. We amputate by sawing through the middle of the os suffraginis after dissection of appropriate flaps. While the ultimate result in the majority of cases was good in that the animal was restored to usefulness, the immediate post-operative course was far from satisfactory. Gross infection developed with necrosis and sloughing; the animal was often in severe pain, appetite was reduced and milk secretion often fell to a negligible quantity. Healing was generally delayed for 28 days or more and, in some, operation failed due to involvement of the tendon sheaths or of the fetlock joints. Our experience of sulphanilamide applied at the time of operation and as a daily dressing was that it did not alter the clinical course.

I do not propose to make any reference to the use of sulphonamides in the dog. Many of you will have had more experience of them in this species than I. I would say, however, that my mind is not clear as to the exact bacteriological picture of sepsis in the dog, and thus I am not sure which, if any, of the sulphonamides it is rational to apply. My experience of accidental wounds has been that, provided they are adequately dealt with from the surgical viewpoint, healing is generally rapid and relatively uncomplicated,

while in regard to surgical wounds, results under modern technique are so good that the assessment of the value of a dressing becomes extremely difficult.

To pass to a consideration of penicillin: Florey has postulated that for the local application of the agent, there must be adequate access to all infected areas and a concentration of the agent sufficient to inhibit bacterial growth must be maintained continuously until the body defences have had time to deal with the bacteria. He also states that the development of special surgical methods is often essential to ensure that these conditions are fulfilled.

When dealing with animals, and particularly large animals, many factors tend to make fulfilment of these requirements an impossibility. Animals being what they are, technical difficulties associated with continuous application are insurmountable while farm economics preclude the frequent attention which accurate penicillin therapy demands. So many of our accidental and surgical wounds are situated in parts of the body where the continuous application of a dressing by means of irrigation tubes is impossible. We cannot keep our patients in bed in a posture of our selection. They must have freedom to stand up, lie down and move about at will. In the case of wounds involving limbs it is an easy matter to apply the dressing on gauze and maintain it in position by bandages but it is impracticable to change the dressing sufficiently often to ensure that active penicillin shall constantly be in contact with wounded surfaces.

Nevertheless, I propose to recount a few somewhat exceptional cases in which penicillin was applied locally or administered parenterally under reasonably practical conditions and make comments on the possible influence the agent may have had on their course.

A five-year-old Ayrshire cow was admitted to hospital with pyogenic infection of the terminal joint of the lateral digit of the right hind leg. The condition had existed a month; there was severe pain, some loss of flesh and milk yield had fallen considerably. Swabs from the lesion revealed *C. pyogenes*. The digit was amputated. On completion the wound was packed with gauze tampons soaked in penicillin (500 u. per c.c.) and bandaged. The evening of operation the animal gave about a pint of milk. The wound was treated once daily; first washed with sterile normal saline solution and then repacked with penicillin tampons and bandaged. There was a striking absence of pain during the healing period and weight was taken on the limb throughout. Appetite was excellent. For the first five days there was no pus in the wound, although it emitted the typical sour odour of bovine infected wounds. On the sixth day a little pus was found under the blood clot covering the bone. A little of the latter was removed so that penicillin should come into contact with the area. A noticeable feature of the blood clot was that it remained reddish-brown in colour and became dense and tough in consistency. This was in contrast with the putrefying clot to which we were accustomed. Healthy granulation tissue was visible on the sixth day and its development proceeded unchecked. Very little pus formation occurred throughout and the animal was discharged on the 20th day with the cavity filled by healthy granulations. The cow's well-being was indicated by her milk yield; on the second day it was 18 lb., on the third 33 lb., and from then to the time of her discharge it fluctuated between 21½ to 36½ lb. (I might add that we are unable to feed sufficiently to encourage high yields.) Swabs were taken from the depth of the wound daily. *C. pyogenes* was isolated on two occasions only—eighth and 16th days. On other occasions a variety of organisms was found. *Proteus vulgaris* was constant, variables were *Bact. coli*, enterococci, *Staph. albus* and non-haemolytic streptococci.

Whether these findings were a true picture of the bacteriology of the wound I am not prepared to say. I rather think that *C. pyogenes* was present more often than this report indicates. Nevertheless, the post-operative course was much more satisfactory than is usual in these cases.

A second opportunity to try out penicillin in the treatment of this condition arose nine days ago.

A nine months' Friesian heifer was the subject. The case was a bad one. An infected sinus extended from the interdigital cleft around the coronary band to the external aspect, where it was discharging from several orifices. There was marked swelling as high as the fetlock and the animal was in severe pain. After amputation, the interior of the terminal articulation was found to be involved, the articular cartilage of the os pedis having sloughed away. Preliminary swabs revealed *C. pyogenes*. The same treatment was carried out—initial and daily packing with penicillin-soaked tampons. (Washing with normal saline solution was discarded.) I have been watching this case most carefully. Again, the relatively low degree of pain has been a striking feature. Again, also, hardening of the clot and the relative absence of pus has been noticed. A little only has been found under the clot but removal of the latter has caused a recurrence of haemorrhage. Active granulation has been present since the sixth day. *C. pyogenes* has not been isolated in post-operation swabs, but *Bact. coli* in pure culture has been found daily.

Although it is far too early to draw conclusions, this case affords further evidence of the probable value of penicillin.

A third case leaves me entirely confused.

A young Friesian cow was admitted to hospital eleven days ago. The case was one of acute traumatic pericarditis. The history was one of complete inappetence for several days and on examination the pulse rate was 120 with gross jugular enlargement and a little odema of the intermaxillary space. Temperature, 102·5°. The clinical picture was typical of the condition. Rib resection and drainage (Pugh, L. P.) of the pericardium were performed under the intravenous chloral hydrate anaesthesia. (The degree of toxaemia present can in measure be assessed by the fact that in a cow of weight estimated at 9 cwt., 28 grammes of chloral hydrate gave complete anaesthesia.) At a conservative estimate, the pericardial sac contained 1½ gallons of serous exudate. Its odour was that with which those of us called on to interfere with retained foetal membranes are so familiar. The sac was first flushed out with sterile normal saline and then half a litre of penicillin (500 u. per c.c.) poured into it. A tube was passed into the pericardium around the base of the heart and the upper parts of the skin wound closed by suture. Penicillin-soaked tampons were packed into the wound in the chest wall.

Penicillin solution was run into the tube four times daily for the first week—about 150,000 units a day were used in this way. The day following operation there was a remarkable change in the cow; I had not seen anything so striking in previous cases. She ate 10 lb. of hay, some concentrates and some roots. Pulse was 112; temperature 102·5°. Since that time her appetite has been almost normal and rumination regular. Exudate during the post-operative period has been serous in character, of the usual foetid odour, and the edges of the cut muscle at first took on that pale green parboiled appearance that we associate with infection. I noticed, however, on the sixth day that although there was no evidence of granulation, muscle colour was becoming reddish again.

So far it would appear reasonable to assume that penicillin was having a beneficial effect in this case. But let us examine the bacteriology. To our consternation the only growth or culture from the exudate—5 c.c. were sent to the bacteriologist—was a sparse one of enterococci in pure culture. I am quite in the dark as to the significance of this organism and in any case it is penicillin insensitive. My own view, based on previous experience, is that *C. pyogenes* was the essential invading organism despite the fact it was not present in the exudate. Swabs taken from the heart sac daily since operation have yielded *Bact. coli* and *Proteus vulgaris*; also penicillin insensitive organisms. Diphtheroids have been found on one occasion.

Confusion becomes further confounded by watching her temperature.

For the first six days after operation it ranged between 102·0° and 102·7°, but on the seventh morning it was 105°, although appetite was maintained. One million units of penicillin were given at once by intramuscular injection and a further million during the next nine hours in three—one-third million—subcutaneous doses. The temperature remained unaltered by the treatment; in fact it rose to 105·3° by the ninth hour and persisted in this region for the next 24 hours.

While not conclusive the greater weight of evidence in this case is on the side of natural causes rather than penicillin.

The following cow case has a number of interesting features:—

A four-year-old attested Ayrshire cow was sent to us as a case of traumatic pericarditis. It was generally accepted as hopeless but we were requested, if possible, to save the calf as she was approaching term and was an animal of high pedigree. After a careful consideration of the clinical and haemocytological features of the case our conclusion was that it was one of diffuse peritonitis; probably due to the breakdown of an old traumatic lesion due to the increasing weight of pregnancy. It was decided to perform caesarian section and allow the cow a chance to recover. At the time of operation, pulse rate was 116 and temperature 103°. Estimated weight, 10 cwt.

General anaesthesia was induced by the intravenous injection of 40 grammes of chloral hydrate and a low, right flank incision 10 inches long and parallel with the mammary vein, adopted. On opening the abdomen, a gallon or so of foetid serous exudate escaped and it was noted that the viscera which came into view, particularly the uterus, were coated with fibrin. A living bull calf of approximately 80 lb. weight was removed but the foetal membranes were so firmly attached that no attempt was made to remove them. A litre penicillin (500 u. c.c.) was to hand; 300 c.c. were poured into the uterus and the remainder into the abdominal cavity. The uterine and abdominal incisions were closed in the usual way. The calf lived and was sent home two days later. The morning after operation the cow was on her feet, her condition appearing to be

the same as before operation; one million units of penicillin were given subcutaneously. From this point the cow slowly recovered and was discharged from hospital relatively normal 15 days later. But for some suture abscesses the abdominal wound healed by primary union. No interference with the foetal membranes was made until the sixth day after operation, when they were removed by gentle traction on those parts present in the vagina. Needless to say—they smelled.

There are many features of this case which are worthy of extended discussion. To the question, do I think that penicillin helped her, I can only reply, I don't know. At the time I thought it did, but continuing experience only leaves me more and more amazed at the wonders of the animal organism.

I will conclude with an equine experience.

A six months' hackney colt was admitted with a right-sided scrotal hernia the size of a man's head and a left-sided ventral hernia almost twice that size. The history was that both ruptures had occurred a month previously when the animal had broken through the fencing of the paddock. Since the accident it had had two attacks of colic but its health was comparatively normal. Both herniae were irreducible.

The scrotal lesions was dealt with first, operation being performed under intravenous nembutal anaesthesia (continuous injection). The hernial sac was dissected out and incised; the peritoneum comprising it was about ¼ inch thick. After progressively returning the intestine to the abdomen—it is estimated that about 3 feet were involved—the abdominal orifice was closed by a series of Halstead sutures through the neck of the sac. The remainder of the sac was removed. The exposed area was powdered with sulphamezathine and the scrotal incision closed by suture. Antitetanic serum was given and during the following 48 hours, eight doses each of a quarter million units of penicillin were injected subcutaneously. Healing was by primary union and at no time during the post-operative period did the colt show the slightest departure from health.

Eighteen days later the second rupture was dealt with, again under nembutal anaesthesia. The hernial sac had acquired a thickness of more than half an inch. On opening it about five feet of small intestine were found to be involved. There were firm adhesions between the various loops of bowel to themselves and to the lining of the sac and before reduction could be effected these had to be broken down. This provoked fairly profuse haemorrhage. Reduction was most difficult because the abdominal aperture was at the posterior end of the sac near the inguinal ring and a considerable amount of intestinal manipulation was necessary. The abdominal wall was repaired by suturing the neck of the sac, excess of which was cut away. After thorough powdering with sulphamezathine, the skin wound was closed. Penicillin treatment was repeated—eight to a quarter million unit doses during the following 48 hours. Again healing occurred without infection, and but for an attack of colic of medium severity and lasting about six hours on the eighth day, the colt was quite well during the second post-operative period.

The first operation occupied 50 minutes, when 40 grains of nembutal were given and the second—one hour—when 42 grains were used.

It is my considered opinion that but for the use of the sulphonamide and/or the penicillin this animal would probably have died after the first operation and certainly would have after the second. There is an unfortunate sequel; the colt which was developing into a fine animal, died in an attack of colic four and a half months later. *Post-mortem* examination, performed by Mr. H. Holroyd, M.R.C.V.S., revealed death to be due to volvulus. There were extensive intestinal adhesions but no signs of sepsis ascribable to the operations.

I will end my remarks by saying that my, as yet, limited experience of penicillin indicates that it probably has a useful part to play in equine and bovine surgery, but to assess accurately the nature and extent of that part will require very much more detailed clinical observation.

Discussion

Sir Alexander Fleming, in opening the discussion, said that he must explain that he knew nothing about wounds of animals, but he had always heard that it was much easier to deal with them than to deal with wounds in man. He would talk only about sepsis. In the 1914 war, when surgeons were presented with masses of infected wounds, they forgot they were surgeons and tried all sorts of chemicals to defeat the sepsis; these were poured into wounds but they did not do much good. It was only when surgeons remembered they were surgeons and kept to definite surgical principles that there was an advance. It became obvious that in a wound where a missile had damaged or killed a good deal of tissue they had to remove such dead or damaged tissue which was a breeding ground for microbes. The body being warm acted as an incubator. It was the same in dead spaces where clots of blood or foreign bodies provided a nidus where the microbes could breed freely. Later on, the method of complete immobilization, added to surgical cleansing of the wound, was another great advance. In the recently infected wound microbes were implanted in the cavity in haphazard fashion by the missile. Before they grew they might be reached by chemicals or with careful debridement and elimination of dead spaces they could be dealt with by the body. But when they grew out and invaded the tissue it was, until recently, impossible to get at them. The important thing was to get at them before they invaded the tissues, and this had been done successfully since the time of Lister. Lister's antiseptics prevented infection but they could not deal with an infection which had established itself in the tissues. The modern antiseptics, the sulphonamides and penicillin, were extensively used in the last war for the prevention of sepsis. After D-day every wounded man received penicillin treatment from the time he was in the doctor's hands in France, in transit on the boat and on the railway in England and in hospital in England until he was operated on. The result of that system was that sepsis was very much reduced and most of the wounds could be closed. This was not local chemotherapeutic treatment for the administration of penicillin by injection reached the microbes through the blood stream. The orthopaedic surgeons found that with penicillin treatment compound fractures could be operated on without spreading the sepsis. They could clean up wounds and take out dead tissue, leave bits of bone which might recover and sew up the wound, put on plaster to immobilize the limb, and if they gave penicillin the compound fracture seemed to heal up like a simple fracture. That was an extraordinary difference from the last war; when he was in a fracture femur hospital in France in 1917 the daily dressings of these compound fractures of the femur were accompanied with great pain, and large numbers died of septicaemia. In this war, with the aid of plaster and chemotherapy, daily dressings were avoided and septicaemia was rare.

As to the treatment of sepsis, he would deal only with the chemotherapeutic aspect. One simple experiment gave some information as to the power of the older antiseptics to kill microbes in a wound. An "artificial wound" was made by drawing out processes from a tube to imitate the irregularities of a war wound. The tube was filled with serum and planted with the usual septic microbes. After 24 hours, when the bacteria had grown out, the artificial wound was dressed by tipping out the fluid and replacing it by the antiseptic solution. After an interval varying from 15 minutes to 24 hours the antiseptic was poured out and replaced with serum and the tube was incubated again. In every case there was an abundant growth of bacteria showing that the antiseptic had been unable to diffuse into the processes and kill the microbes there although diffusion with these processes is much easier than diffusion into the infected walls of a wound into which the microbes have grown. There were one or two interesting things in the 1914–18 war: the Carrell Dakin method was regarded as perhaps the most successful antiseptic treatment. In this Dakin's fluid containing sodium hypochlorite was instilled every two hours through a series of tubes. It was found, however, that in a wound Dakin's fluid lost its potency in less than ten minutes. Therefore, for one hour and 50 minutes out of the two hours there was no antiseptic in the wound. Perhaps that was the reason it was the most successful of the antiseptic treatments of the 1914–18 war. But Dakin's fluid had another action. It increased the exudate of lymph from the walls of the wound. It is common surgical practice to drain the cavity of a wound or abscess with a drainage tube but the walls of the wound are infected and they also need to be drained. Dakin's fluid increased the transudation of lymph from these infected walls. In this it did not act as a direct antiseptic but it made things easier for the normal anti-bacterial mechanism of the body in very much the same way as hypertonic saline which was the serious rival of the Carrel Dakin treatment in the 1914–18 war.

He was especially interested in the action of chemical antiseptics on human leucocytes for these are themselves powerful anti-bacterial agents, as can simply be shown by putting a drop of fresh pus on a culture plate and covering it with a coverslip. (Pus is simply leucocytes in pus fluid.) After incubation there would be no microbic colonies in the pus but merely one or two around the edge of the drop where the microbes had been squeezed away from the cells by the weight of the coverslip. In the pus itself the cells destroyed the microbes. If they heated the pus to 50 degrees (to kill leucocytes) before putting it on the plate they would find the microbes growing all through the pus. That experiment showed that pus was active anti-bacterially. If they were to test blood by adding to it a suitable number of microbes, such as staphylococci, mixing it in with various concentrations of a chemical and then running the mixtures into slide cells, they would find that with the control (blood) about 4 per cent. of the cocci would grow out; with carbolic 1 in 5,000 they would still get 4 per cent.; with 1 in 1,000 carbolic acid they would perhaps get 30 per cent.; with 1 in 600 they would get 100 per cent. This is because the older antiseptics like carbolic acid kill the blood cells before they kill microbes. That

happened with every one of the antiseptics until recent times. The first substance which did not do this was penicillin. But before penicillin was developed the sulphonamides came in. Everybody had had experience with them and they were excellent, but one disadvantage was that they did not function when pus was present. One of the very first experiments done with penicillin some 18 years ago showed a great many of its properties. A gutter was cut in an agar culture plate and this was filled with agar containing fluid from a culture of *penicillium notatum*. The different microbes were streaked across the plate perpendicular to the gutter. Some grew up to the gutter and others would not grow within one or two inches of it. Penicillin was very diffusible and that was very important in a chemical designed to kill microbes inside the body. If the chemical did not diffuse it was unlikely to be successful. He believed that was an important factor. The relative diffusibility could readily be seen by punching discs out of an agar plate and placing in the bottom of the holes thus produced further paper discs soaked in antiseptics. The holes were then filled with agar and staphylococci were planted all over the surface. Antiseptics like phenol, iodine, eusol and flavine did not diffuse sufficiently to prevent the staphylococci growing over the discs but with crude penicillin (say 5 units per c.c.) there was a large area of complete inhibition.

There were a few simple rules with penicillin treatment in man and no doubt with animals it was just the same. It should only be given when the infecting microbe is sensitive to penicillin. It should be given in such a way that it reaches the infecting microbe. It should be given in doses sufficient to kill the infecting microbe, and it should be given for a time long enough to kill the infecting microbe. Newspapers gave people the impression that penicillin was miraculous and the least quantity cured all ills, but that was nonsense. They had got to use it sensibly. It was true that penicillin was very powerful on the right microbes. Pure penicillin could stop the growth of these even when it was diluted 1 in 80,000,000. It was a big dilution and if they tried to work it out in fluid and they multiplied a drop of water 80,000,000 times they would come to the conclusion that it would fill more than 8,000 whisky bottles. Penicillin treatment in man was given in two ways, one so that it got into the circulation and reached the microbe through the blood stream. This was easy but it was very expensive in penicillin and that was where animals had the advantage over humans. In some of the large animals it would require an enormous amount of penicillin by the blood stream method but with dogs, cats or canaries they had an advantage. They could inject the penicillin under the skin in a muscle; it did not matter. It was absorbed into the blood, circulated and reached the microbes. Local treatment was more economical in penicillin but it was more difficult and that was where the surgeon had got to use his wits as how best to use the drug. The object was how to get it at the microbes and keep it there sufficiently long to destroy them. In man it varied with every case and it was probably much the same in animals. Penicillin itself was getting purer. In 1940 the Oxford workers concentrated it and the first clinical results were so good that they thought it must be nearly pure, but it was only about 1 per cent.; in 1943 they were using penicillin about 10 per cent. pure; in 1945 about 30 per cent., and last year about 70 to 80 per cent. was pure. They could buy pure penicillin and pure penicillin was coming in for use in man on delicate tissues such as the brain and the eye. Penicillin was one of the drugs which was not poisonous so there was no fear of an overdose. Other antibiotics were being introduced and doubtless human beings would get them first, but eventually they would spread to animals.

Dr. T. Hare: He would like to join with Professor Wright in thanking Sir Alexander Fleming, whose work had been a great inspiration to them both in the laboratory and in general practice.

A few hours ago he had read with regret of the death of Sir Almroth Wright; it was the passing of one of the most eminent bacteriologists and teachers which clouded their meeting with sorrow. The speakers had not had time to broaden their picture of the treatment of wounds by recalling the treatment of the late Sir Almroth Wright through vaccine therapy. Had Professor Wright taken that into account he would have had a possible explanation for some of his failures and for some of his doubts. He had omitted to ask himself the very important question: "Is the animal infected before operation is attempted and, if so, what is the nature of the infection?" It was a fact that a large proportion of animal patients were infected before operation and the subsequent infection of the site of the operation and other parts of the body was usually due to the spread of the pre-operative infection; this accounted for many of what the surgeon called his failures.

Mr. T. L. Wright: He had had very little opportunity to use penicillin, but he did have an occasion some years ago before it was available to the veterinary surgeon. He had a dog brought in following a street accident with a wound from the inside of the thigh to the paw of a hind leg. It belonged to a famous surgeon. He (Mr. Wright) treated the dog with the simple antiseptic measures. It was the type of case where there was usually healing in seven to ten days or, alternatively, suppuration. The owner of the dog had easy access to penicillin, and he said he would like to use it on this dog. He gave 10,000 units three times a day, and the thing that struck him was that in ten days the wound was perfectly clean with no sign of suppuration. The stitches were all in position, but there was not the slightest sign of healing. He had never seen any of his wounds take that course; either suppuration or healing took place within ten days. The two cut edges were in close apposition and there was no sign of healing and no sign of suppuration, and he wondered if penicillin had any retarding action on repair.

Dr. G. Slavin: At Weybridge they had done a considerable amount of work on the use of penicillin in animals, mainly, of course, in dairy cows. The blood curve in the cow was similar to that in the human being. After intramuscular injection of aqueous solutions the highest blood level was at five minutes after injection with a rapid fall to about 15 minutes, then levelling off to a slow fall, passing the minimum therapeutic level at about three hours; 150 to 300 units per pound of body weight gave suitable concentrations by three-hourly dosage. Three-hourly dosage was, of course, impracticable in veterinary practice, although, experimentally, otherwise intractable conditions did respond to adequate dosage. The limitation of the aqueous solutions led them to try the oily injection, but the results were disappointing. No consistent blood concentrations could be maintained and sometimes large doses lasted only six hours.

There was a widespread belief that penicillin was a very unstable substance. The dried powder had remarkable keeping qualities. The aqueous solution in chemically pure water, sterile and in the cold, would keep unaltered for many months. Even under less favourable conditions it kept remarkably well. Some rubber was very destructive. They tested MacCartney's bottles in which the rubber washers were disintegrating after repeated sterilization, but in spite of this, penicillin solutions in these bottles were intact after 72 hours at room temperature.

Some metals were destructive. They tested copper, zinc, lead and tin. All except tin rapidly destroyed penicillin. The result with tin should not be taken too literally because tinned containers were not necessarily coated with pure tin. Copper was important because the Record type of syringe was certain to contaminate solutions with copper and solutions made with this type of syringe should not be kept but used at once.

Penicillin had not replaced the sulphonamides in veterinary practice. For local use the amount required was small and cost was not so important. In any case it always paid to use the most effective drug. Sulphanilamide was cheap, but had no effect on many organisms. Sulphapyridine was not suitable for local application. Sulphathiazole was the most active sulphonamide.

The treatment of wounds with penicillin should present no difficulty if adequate care was taken to protect the bandage against moisture with a covering such as the liquid plastics.

A Member spoke of movement in wound healing. Provided the tissues of a wound were immobilized, general body movement assisted healing.

Mr. E. O. Longley spoke of dosage, the advantages and disadvantages of using massive doses at long intervals and the expense of the very large doses that might be required, especially in the larger animals. He wondered whether the rapidity of absorbtion could be controlled by reconsideration of the site to be used rather than by admixture with oil; he suggested that, possibly, there would be slower absorbtion if the injection were made into the tail. Alternatively, he suggested that injection into a fatty depot might be a substitute for injection in oil. With regard to oral administration, he discussed what dosage was required and whether there might be any advantage in using a pepsin-resistant container.

He spoke of the significance of vitamins in repair, of vitamin A for resistance to infection and vitamin C for collagen formation. He had obtained the most spectacular results, using injectable vitamins, and mentioned in particular a case with progressive suppurating lesions, that was progressing unsatisfactorily under other treatment, but which responded dramatically to such vitamin treatment—the wounds granulating healthily within 48 hours.

Miss M. J. Freak: On some occasions she used the oily suspension, and she thought that its chief advantage was one of convenience in dogs. She used a dosage of 125,000 units for a 20 to 30 lb. dog once in 24 hours. She felt that possibly it was not sufficiently frequent, but she could not say she had better results when 12-hourly periods were adopted. It was the possible value of the large initial single dose as a prophylactic that was of interest to her. She had in mind a dog savaged by another dog over the eye. There were multiple deep punctures and three-quarters of the lids torn in a circle round the eye. With penicillin she appeared to have saved the dog's eye or saved it from sepsis. She cleaned up the wound with sterile saline and injected 100,000 units of sodium penicillin around the lacerated areas, using penicillin in ointment subsequently as a

local dressing. The dog had practically a normal eye and normal sight afterwards and she had the impression she would not have got that result without the single heavy dose of penicillin used. On the point of operation cases and the protein intake, she had in a few cases given hydrolysed protein by the mouth and she had the impression that in those cases where, for example, there had been a foreign body in the intestines for some time and that were very toxic at the time of operation, they did very much better and picked up more quickly and there was better healing in the wound when she was giving protein hydrolysate than they did without it.

The Replies

Professor Wright: Dr. Hare had taken him to task for not speaking of the use of vaccines to protect against or increase the animal's resistance against pyogenic organisms. He (Professor Wright) was not a bacteriologist but, as he understood it, to be of value there must be positive proof that the vaccine was antigenic and that it provoked antibody formation. He was not aware that they had a substance that would protect cattle against *C. pyogenes* infection. He knew that Dr. Lovell had produced a toxoid which increased the antitoxin titre of the blood, but not an anti-bacterial immunity. As yet that was still in the experimental stage. Moreover, he was not aware that it had been shown that the injection of animals with staphyloccal toxoid protected them from infection by and against the toxins of *Staphylococcus aureus*. He was aware of the experiments so far carried out with mastitis in sheep, but they did not go far enough, and in the field experiments which followed there was no mastitis in the controls. He had indicated in his paper that his mind was not clear as to the exact pus picture in the dog. He was aware that beta-haemolytic streptococci were frequently isolated from dogs; from the pharynx and mucous membranes of the vagina. Some of these animals showed departure from health while many showed no such departure. If he recalled his reading correctly, Sir Almroth Wright had classified certain of the organisms as sero-saprophytes—organisms which were generally found on or in the body and which were able when conditions were favourable to become pathogenic. He (Professor Wright) thought that this was the type of organism they were dealing with chiefly in wound infection in animals. He was not aware of any specific vaccine agents against (1) *C. pyogenes* infection in cattle; (2) staphylococcal infection in dogs; or (3) streptococcal infection in horses.

He had given consideration to the point brought up by Mr. J. L. Wright about wound healing. In the case of the amputation of the digit he had mentioned, he had watched the process of granulation to ascertain whether it had been retarded. Active granulation was present in six days. He would point out, however, that although penicillin was being used the wound was not sterile and they had found *Bacterium coli*. The question brought up the interesting point: what stimulates the healing? Was it liberation of histamine? It was a point to be considered—whether by sterilizing the wound with penicillin they were tending to retard the rate at which it healed.

Wounds about the limbs did not present any great difficulty, but to apply continuous penicillin therapy to wounds in the inguinal canal was difficult. They had adopted the dosage used by Dr. Slavin. Sir A. Fleming had established that, in man, to maintain an active penicillin concentration with a four-hour dosage, 40,000 units were necessary, or a little less for three hours. Having compared the cow's blood volume with that of man, they had come to the conclusion that for the treatment in cattle in four-hour doses it was necessary to give one-third to a million units and, last thing at night, to give 1,000,000 to carry over the interval until dosage was started again next morning. In regard to *C. renale* infection in cattle, they had had cases in which penicillin had sterilized the urine and there was clinical recovery without signs of recurrence over a period of three months, but other cases given this treatment cleared for about a fortnight and then recurred. They were treated again and again recurred. With the third group of cases, penicillin therapy did not have the slightest effect.

The healing, in the case described by Mr. Longley, might or might not have been due to the vitamins; he was satisfied that nourishment of the animal was an important factor in wound healing. They had noticed in rumenotomy in the cow that if the animal ate well during four or five post-operative days it was almost certain that wound healing wou'd be rapid, whereas if it did not eat, healing was delayed. The same held for pyometra operations in the dog and cat. One always regarded the state of the liver as one of the important factors in this matter, and as the liver was the site of storage of vitamin A, it came back to something of that nature.

A member had referred to the protein requirements of the patient during wound healing, emphasizing that unless the nitrogen balance was preserved the tissues would not remain healthy. The presence of globulin was important in the healing of wounds.

Reference had been made to the value of movement in wound healing. It was a matter of degree of movement. Most movement in animals was gross. With bone fractures it was probable that a little movement was a stimulus to repair. As he understood the Orr treatment for fractures, whilst they immobilized the broken bone they encouraged function of the remainder of the part.

Sir A. Fleming also replied to various points brought out in the discussion. Penicillin ointments were used with success on certain types of wounds. He emphasized the importance of the strength of penicillin in the ointment.

With regard to the development of penicillin resistant strains, he stressed the importance of adequate dosage and the failure that occurs when the dosage is insufficient; in the latter case some resistance might be developed by the micro-organism.

The absorption of penicillin was no doubt delayed and its action was prolonged if it was given in an oil wax base. Such a product required to be warmed to enable it to be taken up into the syringe and some people had found it to be troublesome in that as it cooled it became too thick. It was, however, being used on a large scale. He referred to the rate of absorption and elimination of penicillin, pointing out that there was individual variation in this respect. Average figures were: 15,000 units last for two and a half to three hours; 50,000 units about four and a half hours; 100,000 units, five to six hours; 250,000 units, ten hours; 500,000 units, up to about 15 hours. Massive dosage was much more expensive, but it was frequently worth adoption.

The amount of fat at the site of injection did not appear to influence the rapidity of the absorption of penicillin. It was absorbed as rapidly in fat as in thin people. If the gastric juice was very acid penicillin taken *per os* was rapidly destroyed. Administration in a pepsin-resistant container would interfere with absorption.

FIRST INTERNATIONAL CONGRESS OF PHYSIOLOGY AND PATHOLOGY OF ANIMAL REPRODUCTION AND OF ARTIFICIAL INSEMINATION

Professor T. Bonadonna, Secretary-General of the above Congress to be held in Milan, in the course of a report on its organization, states that it has been definitely fixed for June 23rd to 30th, 1948, in order that those participating may take part also in the International Genetics Congress to be held in Stockholm from July 7th to July 14th, 1948, and also in the Zoology Congress which will be held in Paris from July 20th to July 26th.

The Congress, which has been promoted by the Istituto Sperimentale Italiano "Lazzaro Spallanzani" for Artificial Insemination, has obtained the support of U.N.E.S.C.O. (United Nations Educational, Scientific and Cultural Organization) and of F.A.O. (Food and Agriculture Organization), while national committees have been formed in 15 nations.

Very well known workers have been selected to serve as Vice-Presidents of the Congress in the persons of Professor Angelo Cesare Bruni (Italy), Professor Leonardo Grassi (Italy), Professor R. M. C. Gunn (Australia), Professor John Hammond (England), Professor Nils Lagerlof (Sweden), Professor Luigi Leinati (Italy), Professor Silvio Ranzi (Italy), Professor Albert Tyler (U.S.A.), Professor Filippo Usuelli (Italy).

The programme and regulations of the Congress are about to be printed, having been prepared in accordance with the proposals made by the national committees.

On June 21st, 1948, a preliminary conference will take place under the auspices of U.N.E.S.C.O. To this conference there will be invited a limited number of Italian and foreign workers who are to discuss the theme "Interactive Substances of Eggs and Sperm and Parthenogenesis."

The subjects to be considered by the Congress are as follows: (*a*) Biological, (*b*) zootechnical, (*c*) pathological problems of animal reproduction; (*d*) Practical problems of artificial insemination and of animal reproduction. Inasmuch as the subjects treated in some of the sections may be of special interest to practising veterinarians, their participation will be welcomed.

Those who desire detailed information should write to the Secretary-General of the Congress (via Bronzetti 17, Milano).

* * * * *

Weekly Wisdom

Those who have caught something of the grandeur of the Christian view of the world are set free from boredom and are filled with new vitality.—Anon.

CLINICAL COMMUNICATION

Hyper-acute Canine Babesia

[Tick Fever]

By

S. E. PIERCY

Veterinary Research Officer

Veterinary Research Laboratories, Kabete

The purpose of this article is to record an unusual case of canine babesiasis, characterized by sudden death and the absence of premonitory symptoms. A perusal of standard works available [Wenyon (1926), Edwards (1934), Henning (1932), Gaiger & Davies (1946), Hutyra & Marek (1928) and Montgomery (1913)] reveals that only acute cases are recorded, with a syndrome of two to five days' duration, whilst a search of scientific literature covering the past 20 years has revealed no mention of cases similar to the one about to be described.

History.—The subject was a six-months old Great Dane puppy, born and reared in an area in which canine babesiasis is enzootic. On May 17th, 1946, it was admitted into boarding kennels near Nairobi. Prior to this date it had never shown any signs of illness recognizable by its owner. The owner of the kennels, who has had many years' experience in the nursing of dogs affected with tick-borne diseases, examined the dog on arrival and found nothing amiss. The dog was seen again later in the evening and appeared to be in perfect health. Early the next morning it was found dead and was brought to the writer for autopsy.

Post-mortem findings.—Since anthrax in dogs is not uncommon in Kenya, a blood slide was taken before opening the carcase. It was with considerable surprise that the blood was found to be teeming with the parasites of *Babesia canis*. On opening the carcase it was observed that the internal organs and serous membranes presented a uniformly flushed, toxic appearance, characterized by a purplish-red colour. The liver, kidneys, lungs and heart were dark and congested but no petechiae or ecchymoses were seen. The spleen was dark and mottled but not noticeably enlarged. Its pulp was soft and the Malphigian corpuscles were very prominent. The bladder was practically empty, but what urine remained was normal in colour and consistency. The stomach showed no marked abnormality, but the small intestine was strongly tinged with yellow bile whilst the mucous membrane was in the process of peeling away in flakes. The mucosa of the caecum was hyperaemic and haemorrhages were present along the rugae of the rectum. The blood was normal in colour and consistency and there were no signs of anaemia or jaundice. The brain showed intense engorgement of the blood vessels and numerous, irregularly distributed, petechial haemorrhages. Several large, round, haemorrhagic patches were also present and distributed rather symmetrically between the right and left cerebra.

Histopathology.—Smears made by the "squash" method (Purchase, 1945) and stained by the Giemsa method proved of great interest. Those made from various parts of the brain showed that many, but not all, capillaries and smaller arterioles were occupied by parasitized erythrocytes, and some vessels appeared to be completely blocked by parasites, many of which were lying free in the lumen. (Fig. 1.) Smears from the liver, spleen, kidneys and lungs all showed the presence of parasites.

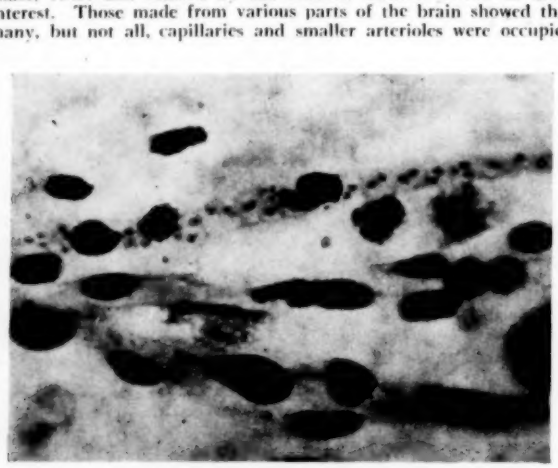

Fig. 1. Brain capillary showing numerous parasites

Histological examinations of sections revealed congestion of the liver and kidneys with degeneration of the parenchymatous cells, active congestion of the spleen and congestion and oedema of the lungs. Sections of the cerebrum and cerebellum showed marked congestion with extensive haemorrhages in some areas. Parasites were very numerous in some blood vessels and capillaries and completely absent in others. Extra-erythrocytic forms were common and some of the vessels were blocked by massive accumulations of parasites.

Discussion

The most important point emerging from this case is the fact that canine babesiasis can occur in a form so acute as to convert a state of apparently perfect health into one of death in a matter of 12 hours or less. It seems reasonable to suppose that an extremely rapid multiplication of parasites must suddenly have taken place, and that even if correct treatment had been carried out the evening before death it would have been ineffective. Canine babesiasis, therefore, must be added to the list of diseases which can cause sudden death without preliminary warning.

The *post-mortem* examination might well have been confusing to a veterinary officer on *safari* with no microscope readily available, since the well-known symptoms of tick-fever such as anaemia, jaundice, haemoglobinuria, enlarged spleen and ecchymoses were absent.

The actual cause of death is a matter of some interest. Histological examinations revealed a certain amount of tissue destruction in important organs, but it is unlikely that these changes alone would have been sufficient to cause such rapid death. Reference has already been made to the toxic appearance of the tissues, but there is little support in the literature for the production of toxins by the Babesiidae. It seems more likely that the answer to this question lies in the brain lesions. Purchase (1947) has described three cases of cerebral babesiasis which came to his notice whilst examining canine brains for rabies. His findings were very similar to those described in this article, namely, an irregular distribution of parasites in the capillaries and smaller arterioles of various parts of the brain. Some vessels were packed with parasites, most of which appeared to be extra-cellular. There were certain differences, however, in that Purchase's cases were not characterized by sudden death whilst in one case at least parasites were very rare in the blood. Nevertheless, the opinion is advanced that the present case was also primarily one of cerebral babesiasis, in view of the occlusion of blood vessels and extensive haemorrhage in the brain, coupled with the absence of other lesions, such as anaemia and jaundice, to which death might have been attributable.

Blood smears stained by giemsa showed an unusually high proportion of parasitized erythrocytes. (Fig. 2.) Most authors consider anything over about 20 per cent. to be well above the average.

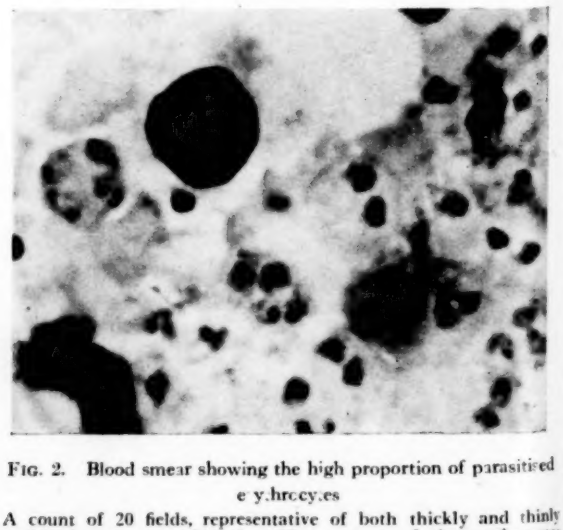

Fig. 2. Blood smear showing the high proportion of parasitised erythrocytes

A count of 20 fields, representative of both thickly and thinly parasitized areas, revealed that 22 per cent. of the erythrocytes contained parasites. In some fields hardly a single cell had escaped invasion. Many extra-cellular forms were seen. (Fig. 3.)

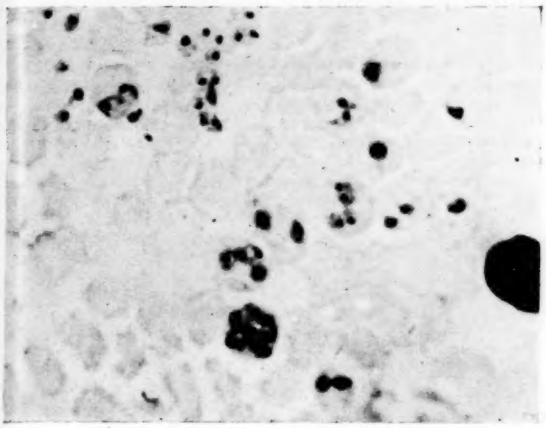

FIG. 3. Blood smear showing extra-cellular forms and one cell packed with parasites

Up to 16 parasites were counted in a single cell; Montgomery (1913) describes as many as 20. Phagocytosis by leucocytes was common but it was not found possible to confirm the observations of Neitz (1938), who considers that neutrophils phagocytose extra-cellular forms only, in contradistinction to large monocytes which phagocytose parasites together with their host cells.

Purchase (1947) mentions that the nuclear mass of extra-cellular parasites in the lumen of brain capillaries was central and points out that this is reminiscent of the toxaplasmata. A careful examination of brain sections and "squash" smears from the present case did not confirm this observation, nor did it appear that most of the parasites were extra-cellular, although some undoubtedly were.

Summary

1. A case of hyper-acute canine babesiasis is described, characterized by sudden death and the absence of premonitory symptoms.

2. The *post-mortem* findings were not characteristic of canine babesiasis.

3. Parasites were numerous in all the tissues examined. In view of the frequent blockage of blood vessels in the brain accompanied by extensive haemorrhages, and the absence of other lesions likely to cause death, it is considered that this case can most properly be described as one of cerebral babesiasis.

4. An unusually high percentage (22 per cent.) of erythrocytes was invaded by parasites.

Acknowledgments.—I wish to thank the Director of Veterinary Services for his permission to publish this article, and I am indebted to Mr. W. P. Langridge, laboratory assistant, for the excellent photo-micrographs.

References

EDWARDS, J. T. (1934.) Encyclopaedia of Veterinary Medicine and Surgery. 2nd edn. London: Baillière, Tindall & Cox.

GILGER, S. H., & DAVIES, G. O. (1946.) Veterinary Pathology and Bacteriology. 3rd edn. London: Baillière, Tindall & Cox.

HENNING, M. W. (1932.) Animal diseases in South Africa. South African Central News Agency, Ltd.

HUTYRA, F., & MAREK, J. (1928.) Special Pathology and Therapeutics of the diseases of domestic animals. 4th edn. London: Baillière, Tindall & Cox.

MONTGOMERY, R. E. (1913.) A system of Veterinary Medicine. E. Wallis Hoare. Vol. I. London: Baillière, Tindall & Cox.

NEITZ, W. O. (1938.) *Onderst. J. Vet. Sci* **10**. 33.

PURCHASE, H. S. (1945.) *Vet. Rec.* **57**. 413.

——. (1947.) *Ibid.* **59**. 269.

WENYON, C. M. (1926.) Protozoology. Vol. 2. 1st edn. London: Baillière, Tindall & Cox.

Addendum

Since writing this article, a further case of hyper-acute canine babesiasis has been brought to the writer's notice. This occurred in a dog belonging to a professional colleague, Mr. W. S. Luke, veterinary officer, Limuru, who has kindly submitted the following case history.

The subject was a five-weeks-old, cross-bred, male puppy which had never shown any signs of ill-health prior to the day of its death. It took its food quite normally one evening at 6.30 p.m. and was found dead three hours later. A *post-mortem* examination was performed and it was observed that the only noticeable abnormality was a grossly enlarged spleen. Smears made from this organ showed it to be teeming with the parasites of *Babesia canis* which, in the words of the owner, "were mostly in the ring form." Blood smears, on the other hand, revealed few parasites and only very slight anaemic changes.

This case is interesting not only because of the extreme rapidity with which death occurred, following a state of apparently perfect health, but also because of the very early age at which the dog was infected.

Questions and Answers

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Artificial Insemination in Dogs

Q. CCXXII.—*What is the best method of carrying out artificial insemination in dogs?*

A.—Bearing in mind that one is up against physical defects in the female genitalia, sexual apathy of one or both sexes involved, and that the results to be expected vary according to the reason for mating disability, then the method now to be described can be claimed to be quite successful. It was worked out about 1924, but possibly instruments are now available to bring the operation more on a par with the bovine technique.

Semen is obtained from the male by massage of the penis outside the sheath, anterior to the scrotum but posterior to the erectile bulb. Most dogs will emit sufficient semen, particularly if they have been allowed to chase round after a bitch beforehand and are sexually excited. It is easy to recognize the moment of ejaculation as the muscular wave carrying the ejaculate can be felt by the massaging hand. The ejaculate is received on a watch glass. A piece of plain surgical gauze about 1 in. square is tied tightly in its middle with stout surgical silk, leaving an end about 6 in. long. This gauze sponge is dipped in the semen and is passed up to the anterior end of the vagina with small crocodile forceps, leaving enough of the silk to protrude from the vaginal orifice. The bitch is then laid on her back for five or ten minutes, to promote the flow of semen towards the os uteri. The sponge should be removed by pulling on the silk half to one hour later. It is important that both male and female should be got into a state of sexual excitement at the time this technique is practised, or litters will be small and puny.

. . . . .

The New Graduate and Income Tax

Q. CCXXIII.—*What is the position of the new graduate as regards income tax—is he subject to it immediately he starts earning? And when he does become subject, is it on a P.A.Y.E. basis for what remains of the present year or on the total earnings for those odd months? (I know as an assistant one is under P.A.Y.E., but as regards earnings between now and January—which is not a complete year—does one still pay on a P.A.Y.E. basis?)*

A.—"Pay as you earn" is applicable only to *employed* persons. A new graduate starting as an assistant would, as the correspondent realizes, immediately become subject to the provisions of this scheme on taking up employment.

Where the new graduate starts in practice on his own account, however, he will become subject to income tax on the annual assessment method: under this he will at the close of the financial year (April 5th) be called upon to make a return of his earnings during that year and to lodge his claim for allowances, and will later be assessed for income tax which will be payable on the following January 1st. In other words, he will pay in arrear, not currently as with P.A.Y.E.

In making his first return, the new graduate should realize that while he will show actual earnings for the year that has passed, his claims for relief will be based on the year to come; if, for instance, he were to take out an insurance policy or was blessed with an addition to his family on April 6th or afterwards, he would in his return for the preceding year lodge a claim for relief for such events.

If the new graduate started his professional career firstly as an assistant and then launched into practice on his own account, any deductions under P.A.Y.E. while an assistant would, naturally, be set against the tax payable under the annual assessment method.

ABSTRACT

[Treatment of Sarcoptic Mange in the Dog by Gaseous Immersion in Sulphur Dioxide. (Trans. title.) Triau. (1947.) *Rec. méd. Vét.* **123.** 166-168.]

The author introduces his article with a short history of the various means, and the research workers who have used them, of employing sulphur dioxide gas in the treatment of mange. The main disadvantage of the method in dogs is that the animals will endeavour to get their heads into the gas chamber.

He describes a satisfactory container, which is a modification of the apparatus described by Degois in *Recueil de Médicine Vétérinaire*, April, 1927.

The essential modifications are: (*a*) The fitting of interchangeable collars, with 12 different adjustments, which ensure that the dog cannot turn its head back into the gas chamber; (*b*) a system which ensures the constant circulation of SO_2 gas around the dog.

A course of treatment consists of three exposures at weekly intervals (the duration of the exposure is not stated). The head is treated separately with a warm emulsion of turpentine and 2 per cent. "Cresyl." It was found advisable to smear the scrotum in dogs and the vulva and mammary glands of lactating bitches with vaseline to prevent any danger of scalding with SO_2.

The author considers this system of treatment highly successful, having treated over 100 subjects with satisfactory results.

He concludes by giving several general considerations which should be remembered in the treatment of mange.

(1) Young debilitated animals should be treated internally with vitamin D_2 as well as having the external treatment with SO_2.

(2) In long-standing cases of mange, with marked skin reactions, it is advisable to clip and wash the animal before treatment.

Dr. Triau considers that SO_2 fumigation is the ideal form of treatment for sarcoptic mange in the dog and puppy. It also gives good results in the treatment of demodectic mange and generalized mange in cats.

REVIEW

["Animal Breeding." A. L. Hagedoorn, ph.d. (State University, Leiden). With foreword by J. Hammond. London: Crosby Lockwood & Son, Ltd. Reprint of 2nd edit., 1946. 304 pp. Price 15s.]

A detailed review of this book which has reached its second edition and fifth reprinting is hardly called for; the popular appeal of Dr. Hagedoorn's exposition of animal genetics would thus seem to be well established in this country. The second edition differs in no material respect from the first.

The author's aim has been to produce "a book for the breeders themselves" which would give them "enough of the knowledge of genetics to enable them to understand the working of the methods they are using, or those they should use." As might be expected in a work of this description, over-simplification of some of the basic principles of genetics has led to occasional inaccuracy and even mis-statement, but these shortcomings will doubtless be of minor importance to the practical breeder.

In regard to the practical problems of livestock improvement, Hagedoorn has much to say which is apt and worth listening to, even though one cannot always agree with the ideas and interpretations which he expounds with such an abundance of self-confidence. Probably the most valuable parts of the book are those where the author, in language which no practical man of average intelligence can fail to understand, exposes the fallacies and humbug that go with modern pedigree breeding. Hagedoorn castigates the false standards of the show-ring and the herd-book societies in relation to selection for the economically useful characters of livestock, and lays forth his views as to how these matters may be rectified. Both the practical reader and the academic geneticist will find much to criticize in Hagedoorn's ideas, but anyone with an interest in livestock improvement will find himself in sympathy with the author's ideals—in his own words, "My own attitude has been consistently this, that we should aim to make each breed of domesticated animals as good as possible to fill its niche in the symbiosis-group in which it exists."

We believe that Dr. Hagedoorn would be well satisfied if his book fosters in the practical breeding "experts" an awareness of the deficiencies of some of their methods. We commend its reading especially to those who magnify the importance of "art" as distinct from "science" in animal breeding; it will do much toward dispelling the ignorance and misconception of the empirical practices, rooted in tradition, which unfortunately still persist in some livestock circles to-day.

QUESTIONS IN PARLIAMENT

Veterinary Practitioners (Qualifications)

On November 10th Mr. George Jeger asked the Minister of Agriculture what action he proposes to take to implement the recommendations contained in the Chancellor Report on Veterinary practice by unregistered persons.

Mr. Gerald Williams asked the Minister of Agriculture when the Government intend to consider the report of the Chancellor Committee on Veterinary practice.

Mr. T. Williams: I am sending each of the two hon. Members a copy of a statement I made on April 1st, 1946, from which they will see that the Government intend to introduce legislation dealing, among other matters, with veterinary practice by unregistered persons on the general lines proposed by the Chancellor Committee.

Mr. Jeger asked the Minister of Agriculture when he intends to introduce legislation to implement the recommendations contained in the second report of the Departmental Committee on Veterinary Education.

Mr. T. Williams: I am unable to say at present.

Mr. Jeger: Is my right hon. Friend aware that this matter is causing great concern among livestock breeders and veterinary surgeons who are very much overworked at the moment?

Mr. Williams: I fully appreciate that point, and I can assure my hon. Friend that I am equally anxious to get that legislation before the House when the opportunity arises.

. . . . . .

Fowl Pest

On November 3rd, Mr. G. Williams asked the Minister of Agriculture what the figures of fowl pest notified to his Department and the number of fowls slaughtered have been for July, August and September last.

Mr. G. Brown: There were 112 outbreaks of fowl pest in July, 62 in August and 146 in September. The numbers of birds slaughtered in those months were approximately 19,600, 5,300 and 13,000 respectively.

. . . . . .

Vivisection (Cancer Research)

Mr. Braddock asked the Secretary of State for the Home Department how many experiments in cancer research, with and without anaesthetics, were performed on animals under the Cruelty to Animals Act. 1876, during the year 1946.

Mr. Ede: The figures are 7,918 and 24,368 respectively.

. . . . . .

Jury Service

Mr. Medlicott asked the Secretary of State for the Home Department if he is aware that jury service falls unevenly and sometimes onerously on some members of the community; and whether legislation is contemplated during the present Session to implement some of the recommendations on jury service which were proposed by the Departmental Committee which reported on this subject as long ago as 1913.

Mr. Ede: I regret that I cannot hold out any hope of legislation on this subject during the present Session.

. . . . . .

Crown Servants (Published Works)

Mr. Pitman asked the Financial Secretary to the Treasury what are the general principles under which State employees are allowed or forbidden for payment to write for publication on technical matters peculiar to their specialization.

Mr. Glenvil Hall: A Crown servant must obtain the consent of the head of his department for the publication of any work the subject-matter of which is connected with his official duties or those of other public servants. In cases where the work is considered to owe its value exclusively to the author's ability and research, no special financial arrangements are made. In other cases the Government may either arrange for official publication or stipulate that copies should be supplied for the public service at a special rate.

. . . . . .

Medical Practitioners (Cars)

Mr. Lester Hutchinson asked the Minister of Fuel and Power if he will allow medical practitioners, with the limited amount of time at their disposal, and who have to be on call all day and every night, to use their cars for all purposes within a radius of ten miles of their consulting rooms, in order to permit them some measure of relaxation and yet remain within speedy recall.

Mr. Gaitskell: This matter on which I have received certain representations from the British Medical Association is under consideration.

NOTES AND NEWS

Diary of Events

Nov. 15th.—Annual Meeting of the Society of Women Veterinary Surgeons, at Church House, Westminster, S.W.1, 11.30 a.m.

Nov. 19th.—Meeting of the Royal Microscopical Society at B.M.A. House, Tavistock Square, W.C.1, 5 for 5.30 p.m. (*See Notice.*)

Nov. 26th.—Meeting of the West of Scotland Division, N.V.M.A., at Glasgow (George Hotel, Buchanan Street), 2.30 p.m.

Nov. 27th.—Meeting of the Society of Veterinary Practitioners at Cambridge (Institute of Animal Pathology, Milton Road), 2.30 p.m.

Nov. 28th.—Meeting of the Royal Counties Division, N.V.M.A., at Reading (Caversham Bridge Hotel), 2.30 p.m.

Nov. 28th.—Meeting of the Southern Counties Division, N.V.M.A., at Winchester (Cadena Restaurant), 2 p.m.

Nov. 28th.—Annual Meeting of the North Wales Division, N.V.M.A., at Rhyl (Imperial Hotel), 2.30 p.m.

Nov. 28th.—Meeting of the South Wales Division, N.V.M.A., at Swansea (Mackworth Hotel), 2.15 p.m.

Dec. 3rd.—Meeting of the Association of Veterinary Teachers and Research Workers (Scottish Regional Group), at the Glasgow Veterinary College (83, Buccleuch Street), 2.30 p.m.

Dec. 10th.—R.S.I. "Benjamin Ward Richardson" Lecture, at the Institute, Buckingham Palace Road, S.W.1: "The Transport, Handling and Lairage of Animals intended for Slaughter," by C. G. Allen, M.R.C.V.S., D.V.S.M., Chief Veterinary Officer, Birmingham. Professor Geo. H. Wooldridge, F.R.C.V.S., M.R.I.A., in the chair; 2.30 p.m.

Jan. 14th, 15th and 16th, 1948.—Meetings of Committees and Council, N.V.M.A. Committees at 36, Gordon Square, W.C.1, Council (16th) at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2.

* * * * *

PERSONAL

Births.—Green.—On November 7th, 1947, to Margaret and Reginald A. Green—a son.

Mortimer.—On November 6th, 1947, at Bonawa Nursing Home, King's Lynn, to Joy, wife of Donald Mortimer—a son.

Stewart.—On October 23rd, 1947, at The Cottage, Ashton, Nr. Chester, to Joan (*née* Dowlen, M.R.C.V.S.), wife of Charles A. Stewart, M.R.C.V.S.—a daughter.

. . . . .

His Majesty's Investiture.—At the investiture held at Buckingham Palace on Tuesday of last week Dr. Russell Greig received at the hands of His Majesty the insignia of a Commander of the Civil Division of the Most Excellent Order of the British Empire. As recorded in our issue of June 22nd, 1946, Dr. Russell Greig's award was announced in the King's birthday Honours List, His Majesty's birthday in December of that year being officially celebrated in June, 1946.

. . . . .

Marriages.—Goodall.—Matthews.—On November 3rd, 1947, quietly in Cheltenham, Lt.-Col. Frank Goodall, R.A.V.C., to Iris Matthews. Address: Park House, West Park Place, Cheltenham.

Lowes—Cox.—At Market Place Methodist Church, Rugby, on October 15th, 1947, Emerson Lowes, M.R.C.V.S., to Dorothy May Cox, elder daughter of Mr. and Mrs. J. P. Cox, 219, Hillmorton Road, Rugby.

* * * * *

R.C.V.S. OBITUARY

Pottie, Alexander, late of Paisley, Renfrew. Graduated Edinburgh May 30th, 1891. Died at Millig, Helensburgh, November 5th, 1947; aged 78 years.

Ringer, Edgar, Guy Street, Leamington Spa, Warwick. Graduated London, May 10th, 1893. Died at Redland Lodge, Lillington Avenue, Leamington Spa, November 6th, 1947; aged 76 years.

* * * * *

Ban on the Import of Books

Reply to Representations by the Association

The following reply has been received from the Board of Trade to representations made by the Association urging that, in the interests of the prosecution, practice and teaching of veterinary as of other branches of science, the recently imposed ban on the import of learned scientific and technical books should be lifted:—

Board of Trade,
Millbank, S.W.1.
November 4th, 1947.

Dear Sir,—The President has asked me to reply to your letter of October 17th about the ban on the import of certain books from abroad except under individual licence.

In case you have not seen details of the new arrangements regulating the import of non-fiction books, I enclose for your information copies of Notice to Importers Nos. 261 and 263, from which you will see that provision has been made for licences to import learned, scientific and technical books in English to be granted to pre-war importers of such books to the extent of 100 per cent. by value of their pre-war imports. As an appreciable proportion of the pre-war imports of these books was, in fact, re-exported from this country, this means that the volume of imports under the new arrangements may not be seriously less than the volume of the pre-war imports retained for home consumption.

The President knows that the war prevented the printing and publishing in this country of many books essential to medical men, scientists and others, and that the U.S.A. is in some cases now the only source from which such books can be obtained. Under the import quotas which will be granted to pre-war importers, it will be possible for such books to be imported in quantities which ought to be adequate to meet all essential needs.

If any professional member of your Association finds it impossible to obtain through his bookseller any book which is essential for his professional purposes, I can assure you that if he will write to the Import Licensing Department, 189, Regent Street, London, W.1, an effort will be made to assist him to get the book he requires.

Yours faithfully,
E. Gower,
Private Secretary.

The Secretary,
National Veterinary Medical Association,
36, Gordon Square, London, W.C.1.

* * * * *

ANTI-VIVISECTION SOCIETY NOT A CHARITY

Recording the recent decision of the House of Lords that the National Anti-Vivisection Society is not a charity and is therefore liable to pay income tax, the *British Medical Journal* reviews as follows the stages in the case which have been noted in our own columns as it has passed through the Courts:—

"The Special Commissioners had allowed the Society's claim, unwillingly, feeling that they had to follow the 1895 case in which Mr. Justice Chitty had ruled that the Society was a charity on the ground that its intention was to benefit the community, and that the court should stand neutral on the question whether actual benefit to the community followed or not. The Commissioners appealed to the Court, and Mr. Justice Macnaghten found in their favour, the Court of Appeal confirming his decision by a majority.

"Their Lordships (Lord Porter dissenting) held that the overriding test of whether the object of a society was charitable was whether it was in the public interest, and that this question was for the court to answer from the evidence before it, weighing the effect on the community against the purpose of the society as expressed in its stated objects. Having regard to the finding of the Commissioners that on balance the object of the Anti-Vivisection Society was detrimental to the public interest, they held that there could be no ground for saying that it was a charitable object.

"Lord Porter in his dissenting judgment said that the object of the Society was the protection of animals from the sufferings believed to be involved in vivisection. That object was, in accordance with the decisions in the 'animal cases,' charitable. He could not accept the view that, when once an object had been held to be in the class of charities, it was then for the court to hear the evidence of both sides as to whether it was in fact beneficial. The object, in his opinion, did not cease to be charitable even if its success would be gravely injurious to the public benefit."

* * * * *

DUBLIN VETERINARY COLLEGE PRIZE DISTRIBUTION

At the recently held annual prize distribution at the Veterinary College, Ballsbridge, Dublin, the Principal, Professor T. G. Browne, M.Sc., M.R.C.V.S., occupied the chair and presented the prizes. Dr. J. Carmichael, M.R.C.V.S., London, later delivered an interesting lecture, illustrated by films, on "The Preparation and Uses of Recent Drugs of Interest to the Veterinary Profession."

List of Prizewinners

Final Year—W. J. Prendergast—Silver Medal, surgery; J. C. Shiel—Bronze medal, medicine; J. F. Corcoran—Silver Medal, clinical medicine and surgery; I. B. Besant—Bronze Medal, surgery; H. Martin—Bronze Medal, obstetrics; D. O'Gorman—Bronze Medal, meat inspection.

Fourth Year—D. Loughlin—Silver Medals for pathology and parasitology; E. J. Sweeney—Bronze Medals for pathology and parasitology.

Third Year—D. B. Prendiville—Silver Medal, senior anatomy; J. A. Stephenson and F. Mahon tied—Silver Medals for hygiene; P. Stewart—Bronze Medal, materia medica; J. J. Fanning—Bronze Medal, senior anatomy; C. A. Murdock—Bronze Medal, hygiene.

Animal Management—F. Mahon—Silver Medal.

Second Year—J. K. Kealy—Silver Medal for physiology and Bronze Medal for senior anatomy; J. P. O'Connor—Silver Medal, senior anatomy; Bronze Medal, histology; Bronze Medal, physiology.

First Year—E. d'H. Dexter—Bronze Medal, junior anatomy; M. A. Scully—Bronze Medal, chemistry (pract.).

* * * * *

An elderly Border Hill shepherd in the Billingham area (Northumberland) is alleged to have contracted louping ill disease after being bitten by a sheep tick. He is now recovering in hospital. The authorities are carrying out an extensive research into the cause, effect and cure of the illness.

* * * * *

Scheme for the Control of Diseases of Dairy Cattle

STATEMENT SHOWING THE NUMBER OF UNDERTAKINGS NOTIFIED TO THE MINISTRY OF AGRICULTURE DURING THE MONTH ENDED OCTOBER 31ST, 1947

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
ENGLAND					
Bedford	—	8	8	145	77
Berks	—	47	47	1,516	1,052
Bucks	—	20	20	529	552
Cambridge	—	—	—	—	—
Cheshire	—	130	130	4,427	1,922
Cornwall	—	—	—	—	—
Cumberland	—	9	9	387	304
Derby	—	212	212	5,960	3,376
Devon	2	109	111	1,642	1,238
Dorset	—	10	10	320	144
Durham	1	158	159	3,459	1,408
Essex	1	94	95	3,286	2,482
Gloucester	2	29	31	1,047	864
Hampshire	1	122	123	4,201	2,726
Hereford	—	5	5	163	137
Hertford	—	24	24	778	519
Hunts	—	—	—	—	—
Isle of Ely	—	—	—	—	—
Isle of Wight	—	—	—	—	—
Kent	2	62	64	1,509	1,047
Lancs	—	80	80	2,423	1,103
Leics.	1	59	60	1,460	1,210
Lincs. (Holland)	—	—	—	—	—
Lincs. (Kesteven)	—	11	11	124	105
Lincs. (Lindsey)	—	13	13	388	401
Middlesex	—	1	1	9	13
Norfolk	1	51	52	1,703	1,247
Northants	1	21	22	528	594
Northumberland	—	30	30	1,022	696
Notts	4	104	108	2,618	1,456
Oxford	—	9	9	228	211
Rutland	—	—	—	—	—
Salop	6	51	50	7,867	1,117
Soke of Peterborough	—	—	—	—	—
Somerset	2	94	96	2,349	1,411
Staffs	4	90	94	2,757	1,868
Suffolk (East)	1	19	20	389	298
Suffolk (West)	—	22	22	428	332
Surrey	1	45	46	1,232	729
Sussex (East)	3	58	61	1,848	1,372
Sussex (West)	—	34	34	1,111	686
Warwick	1	55	56	1,598	931
Westmorland	—	3	3	51	21
Wilts	—	34	34	1,315	862
Worcester	1	77	78	1,485	884
Yorks (E.R.)	—	45	45	748	567
Yorks (N.R.)	1	54	55	1,242	847
Yorks (W.R.)	8	96	104	2,581	1,267
TOTAL, ENGLAND	44	2,195	2,239	66,823	37,976
WALES					
Anglesey	—	10	10	151	109
Brecon	—	5	5	99	68
Caernarvon	—	25	25	461	194
Cardigan	—	29	29	599	466
Carmarthen	—	145	145	2,856	1,540
Denbigh	—	11	11	215	111
Flint	—	23	23	576	274
Glamorgan	1	32	33	568	287
Merioneth	—	—	—	—	—
Monmouth	—	8	8	165	123
Montgomery	—	—	—	—	—
Pembroke	—	7	7	197	235
Radnor	1	—	1	5	1
TOTALS	46	2,490	2,536	72,655	41,324

Notes.—(1) Operative periods of undertakings: 1 year, 635; 2 years, 148; 3 years, 1,753. (2) Undertakings renewed for further periods: 1 year, 15; 2 years, 4; 3 years, 9. (3) Undertakings not renewed at end of operative periods: 110. (4) The figures showing the number of undertakings notified during the month relate to entirely fresh undertakings and do not include undertakings renewed for further periods. Undertakings which have been cancelled or not renewed are not included in the figures for previous notifications.

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
SCOTLAND					
Aberdeen	—	16	16	861	378
Angus	—	13	13	540	345
Argyll	—	—	—	—	—
Ayr	—	10	10	350	222
Banff	—	1	1	120	20
Berwick	—	1	1	22	7
Bute	—	—	—	—	—
Caithness	—	—	—	—	—
Clackmannan	—	1	1	19	14
Dumfries	—	12	12	617	564
Dunbarton	—	—	—	—	—
East Lothian	—	1	1	20	8
Fife	—	22	22	693	477
Inverness	—	—	—	—	—
Kincardine	—	2	2	60	68
Kinross	—	3	3	60	43
Kirkcudbright	—	6	6	781	712
Lanark	—	5	5	235	150
Midlothian	—	—	—	—	—
Moray	—	—	—	—	—
Nairn	—	—	—	—	—
Orkney	—	—	—	—	—
Peebles	—	—	—	—	—
Perth	—	12	12	412	292
Renfrew	—	4	4	151	101
Ross-shire	—	3	3	130	62
Roxburgh	—	—	—	—	—
Selkirk	—	—	—	—	—
Stirling	—	7	7	254	219
Sutherland	—	2	2	44	6
West Lothian	—	3	3	95	53
Wigtown	—	15	15	1,247	78
Zetland	—	—	—	—	—
TOTAL	—	139	139	6,711	4,449

Notes.—(1) Duration of undertakings: 1 year, 41; 2 years, 5; 3 years, 93. (2) Undertakings renewed for a further period (included in the second column of the statement): 1 year, 125; 2 years, 9; 3 years, 72. (3) Undertakings expired and not renewed (not included in the second column of the statement): 264. (4) The figures in the first column of the statement relate to entirely fresh undertakings.

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the country in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

SWINE FEVER:

Lincs. (Kesteven).—Somerton Castle, Navenby, Lincoln (November 5th).

Notts.—Lynwood House, Somersall Street, Mansfield, Notts. (November 11th).

* * * * *

AGRICULTURAL PAGEANT FEATURE OF THE LORD MAYOR'S SHOW

Agriculture and its progress in the past 1,900 years was the dominant note of the principal feature of this year's Lord Mayor's Show, held on Monday last, and which took the form of a pageant entitled "The Country comes to the City." The pageant was designed, with Government support, to illustrate how much the townsman depends on the products of the soil and, in present circumstances, of our own home soil.

The pageant opened with a pictorial representation of British agriculture through the ages, divided into four periods, from primitive days to present times. The Ministry of Agriculture presented a tableau in support of the drive to secure a million volunteers for work on the land.

The farm horse was represented by three leading breeds—the Shire, the Suffolk and the Percheron. The young farmers' clubs, the National Farmers' Union, and Corn and Agricultural Merchants staged exhibits and the Agricultural Co-operative Society illustrated methods of egg production and grading.

Milk production was the subject of a story "From Cow to Consumer," staged by the Milk Marketing Board; and the National Union of Agricultural Workers mounted a display showing the relation of housing to many rural problems.

* * * * *

The Royal Show of 1949 may be confined to attested cattle whether from milk or beef herds. This principle has been adopted on the recommendation of the Veterinary Committee, but it will not be applied at the York Show next summer.

MINISTRY OF AGRICULTURE NEWS SERVICE

The Importance of Water

The need for an adequate water supply on every farm calls for little emphasis. A cow in milk with the necessary dairy equipment requires up to 30 gallons daily, other cattle 10 gallons, a sheep 1½ gallons and a pig twice as much. An ordinary farm cottage with proper sanitary arrangements will deal with 50 gallons, and a small farmstead around 800 gallons daily.

Nowadays, with manufactured articles so scarce, those we have got must be used to the utmost, and so any farm scheme needs various licences, the first approach being to the County Agricultural Executive Committee, who will advise and, in suitable cases, can recommend financial help by the State. Conditions are explained in a leaflet No. 4724, "Grants for Farm Water Supply Schemes," which may be obtained free from the Committee or from the Ministry at Block 4, Bickenhall Mansions, Baker Street, London, W.1.

Considering broadly the water supplies available and the best ways of using them, the note proceeds:—

The origin should be beyond suspicion, especially when wells are used, as it is possible for very pleasant looking water to be heavily contaminated. Since the Committee will not recommend a scheme without a satisfactory analysis of the supply, this matter is better settled in the very early stages, to save possible disappointment.

There are many ways of transferring water from the source to storage or points of consumption. Gravity and wind are the simplest, and the next is by ram, which will require about ten times as much water for motive power as is delivered for consumption. A petrol engine has the slight disadvantage that some travelling may be needed to get to it, though the visit usually fits in with some routine animal inspection. An electric motor with automatic control is the method de luxe. It is usually fitted and forgotten until the water supply fails, possibly through lack of the minimum attention that an electric motor needs.

Whatever the supply method, adequate storage is essential. On the figures already mentioned a small farm will make use of 800 gallons daily, and storage capacity for a week or ten days is not unduly large. In normal circumstances the method of storage, together with all other details, depends entirely on local conditions. Obviously a well covered sunken reservoir offers better protection against heat and cold and is cheap to construct. Open tanks are a nuisance; they collect all kinds of rubbish that gets into the pipes and valves, eventually blocking them. Sometimes it may be convenient to store the bulk supply on a low level, using an auxiliary pump to deliver a small quantity higher up.

Cheeseparing in pipe sizes is false economy. A small bore between the supply and storage puts considerable strain on the pump, while the same thing in the service section may reduce the supply to such an extent that although ample water is available at the source, shortages occur at various points. Allowance must also be made for furring.

Pipes should never be laid less than two feet deep in the ground to prevent frost damage. In buildings they should be kept away from draughty corners, and where exposed it is best to cover them during the autumn rather than wait for a winter burst.

Short lengths are best laid by the old-fashioned spade method. Drawing the pipe into the ground behind a mole plough is a quick and cheap method, but it has certain disadvantages. Suitable soil and surface conditions are essential, together with a careful tractor driver who values quality more than speed. Where long distances are involved a trench digger or excavator may prove more convenient and economical.

Water bowl design is a matter of taste. Some favour the pressure type, which certainly saves installation costs. Others like the gravity bowls, asserting that animals prefer a quickly available supply. With these it is necessary to arrange adequate drainage, so that any foreign matter can be easily got out of the pipes.

The position of field tanks needs consideration. Ley farming is on the increase and the yields from new seeds are so luxurious that many fields need temporary division. This cannot be done without a water supply. Usually a water tank is put in a corner of the field nearest the supply pipe. With these new conditions it is well worth putting it in the centre of the field, so allowing sub-division in many directions while a concrete slab underneath will prevent a bog forming around the tank.

In a short article—or in any article—it is impossible to discuss all the aspects that may arise in connection with water supplies, but it is a fact that a good supply, well distributed, is invaluable.

* * * * *

CHANGE OF EMPHASIS TO DAIRYING FORECAST IN WEST COUNTRY FARMING

Development of the West Country into a dairy area instead of a dual-purpose beef area was forecast at Exeter by Mr. H. Twinch, Chief Livestock and Husbandry Advisory Officer for England and Wales, who in addressing a joint technical conference on livestock improvement, stressed the fact that milk had taken first place in Ministry of Agriculture priorities.

Any change of emphasis was important to the West Country with its long tradition of stock-raising, declared Mr. Twinch. The key to increased production was rations, and they had the Minister's assurance that considerably increased quantities of feeding-stuffs should be available by 1949. But dairy farmers and beef producers especially must rely more and more on growing their own protein. Silage was the answer to the problem. The immediate increase in milk must be brought about by improved management. In the long run artificial insemination was the answer to breeding higher yielding cows in the smaller herds.

In an address on "Breeding the Dairy Cow," Dr. J. Mackintosh, Livestock Husbandry Officer, S.E. Province, said pedigree did not assure excellence in production, but merely a record as to ancestry.

The conference was arranged by the National Agricultural Advisory Service and attended by farmers, farm workers, and landowners.

* * * * *

H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net s. d.	*Post free* s. d.
Agriculture and Fisheries, Ministry of:		
Agriculture Overseas. Report No. 6, Development of the Poultry Industry in North America. Report submitted to the Minister of Agriculture and the Secretary of State for Scotland, by the Members of the Poultry Mission following their investigation in the United States of America and Canada during Oct., Nov. and Dec., 1946. February 28th, 1947.	1 6	1 7
House of Commons Bill (Session 1947-48):		
Overseas Resources Development	0 4	0 5
Colonial Office:		
Colonial Fertilisers Experiments, Memoranda on. (1) Planning and Conduct of Fertiliser Experiments. (2) Fertiliser Experiments in Colonial Agriculture. (Colonial No. 214) (58-214) ...	0 6	0 7
Food, Ministry of:		
Food and Nutrition. Vol. 2, No. 10. Oct. 24th, 1947	0 3	0 4

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents should write as briefly as possible and letters should not exceed 350 words.

POLIOMYELITIS AND VIRUS DISEASE OF DOGS

Sir,—Although I fully appreciate the clinical value of the above article by Hamilton Kirk in your issue of October 25th, I regret the publication of material which by any stretch of imagination might be seized upon by a stray journalist as a news scare without justification from a pathological or bacteriological standpoint. A similar implication would insist that because a dog of a certain breed resembled, in colour and conformation, one of his distant cousins, he must therefore enjoy a like propensity for devouring children.

I would like to record that during the past few years I have personally dealt with over 3,500 cases of this "mystery disease" in dogs and in no case has there been any evidence of transmission of infection to or from young persons in daily contact with the affected animals.

There are at present at least three diseases rampant throughout the country which possess certain similarities but which, in my opinion, differ in their aetiology.

(i) *Kennel or Market Disease.*—Exists in most establishments where dogs are bought and sold. Because young puppies chiefly form the basis of trade it is more often encountered therein, but is transmissible to older dogs. Characterized by acute or subacute gastro-enteritis, occasionally attended by convulsions which are probably reflex in character. Cerebral or meningeal complications absent. Responds to bowel sulphonamides and glucose-albu-

men feeding. Not influenced by penicillin. Incubation period about seven days.

(ii) *Typical or atypical distemper.*—Nowadays, usually evidenced by a secondary gastro-enteritis, frequently haemorrhagic. During a later stage of illness some degree of respiratory infection is fairly constant. Chorea, transient paraplegia and keratitis may appear after the more acute symptoms have subsided. Convulsions are often present but are not a constant feature.

Prognosis varies with the complications encountered, but the average mortality is not over 25 per cent.

Seldom occurs in vaccinated dogs. A high percentage of puppies given serum in adequate dosage at the commencement of an outbreak escape obvious infection. Incubation period five to ten days.

(iii) *A disease which appears to correspond with the poliomyelitis described by Hamilton Kirk.*—Has made its appearance in recent years and may have been imported by greyhounds. Is now very general throughout the country.

Incubation period up to three weeks or longer. One or two mild convulsions may occur soon after infection with no other sign of illness, loss of appetite or good spirits for the succeeding ten or 14 days. Ushered in by sudden acute vomiting followed by persistent diarrhoea. Frequently, during the early stages, one encounters pain in groups of muscles—cervical, masticatory or abdominal. The dog may cry out when suddenly lifted. Nervous symptoms, culminating in almost persistent convulsions, appear about the third day of illness. Acute nephritis is a frequent complication. Paraplegia and/or chorea follow almost constantly. There are seldom, if ever, lung complications and the nose and eyes are only mildly affected. The mortality is at least 75 per cent. and the few survivors, after weeks or months of illness, are left with signs of mental degeneration, a tendency to wander with inability to rest, impaired vision and hearing.

In a few carcases submitted to a laboratory, no distemper virus was demonstrable. The disease occurs in vaccinated puppies, even in puppies receiving fortnightly injections of serum. It is common in dogs which have "had distemper" and in those showing typical "distemper teeth." It has no respect for age and has been encountered in dogs of eight and ten years exposed to infection from puppies in the same kennel. It appears to be very fatal to dogs transferred from country to town. The high degree of infectivity of this disease, its deadliness and universal prevalence, together with its resistance to any known method of treatment or prophylaxis, mark it out as deserving of immediate research.

One may be forgiven for regarding chorea as the result of a symbiotic virus which may also be activated by the introduction of other than the distemper virus. This theory might be worthy of further investigation. It is probable also from clinical observation that chorea may manifest itself, in rare instances, either without an accompanying infection or following an infection which has failed to produce symptoms capable of being noticed.

Yours faithfully,

45, St. James' Street, Nottingham. R. H. Smythe.
October 25th, 1947.

* * * * *

ARE THE SULPHONAMIDES TOXIC FOR GOATS?

Sir,—The discussion on Professor Boddie's paper, "Toxicological problems, etc.," together with a personal experience, prompt me to enquire if any reader has encountered fatal poisoning of goats by the oral administration of the sulphonamides. In the case I have in mind the subject was a three-year-old cross-bred nanny some three to four months in milk. She showed a few clots and flakes in the milk from one teat for several days; otherwise, apart from slight induration of the udder, the animal was apparently quite healthy.

Sulphanilamide powder was prescribed and an initial dose of just over ½ oz. was administered by me that evening in a little warm water.

Early the following morning I was called, to find the animal in a comatose condition, with rigor and opisthotonus as in acute digestive staggers of calves. Various stimulant measures and calcium and magnesium therapy were applied, but by midday the goat was dead. On *post-mortem* examination no macroscopic lesions were to be found.

On informing my senior of this, he regretted not having cautioned me in the use of the sulphonamides in goats, as my predecessor had also apparently "killed." in a similar fashion, with an initial dose of ½ to 1 oz. of sulphanilamide.

Yours faithfully,

47, Arundel Road, Littlehampton, Sussex. D. G. Bowen.
November 2nd, 1947.

* * * * *

BOVINE MALIGNANT CATARRH

Sir,—I have read with great interest the article by Messrs. A. Shoshan, M.R.C.V.S., and M. Landau, M.R.C.V.S., "Some Observations on Bovine Malignant Catarrh in Palestine," published in your issue of September 20th.

Contrary, however, to the authors' concluding statement that they ". . . have been impressed with one feature, which was common to all the above causes, namely, absence of sunlight and ventilation in the byres and absence of greenstuffs from the diet . . .," in cases observed in the "Lydda" district, a coastal area in the country, affected animals were stabled in hygienic byres, standing most of the time out of doors, and having ample greenstuff in their diet.

The above tends to exclude the factors mentioned and suggested by the authors as being predisposing causes.

Yours faithfully,

Department of Veterinary Services, Y. S. Goor.
Government of Palestine.
October 28th, 1947.

* * * * *

VICTORIA VETERINARY BENEVOLENT FUND

Sir,—Some time ago a member of the R.C.V.S. living and practising in Australia wrote me asking if I would forward him the names of the five most deserving cases on the books of this Fund as he would like to send them a food parcel. The gentleman in question wished to remain anonymous.

The parcels have now duly arrived and I quote from letters received from the recipients:—

"I am very pleased indeed to tell you that the parcel arrived yesterday. It is a beautiful parcel and contained among other good things a tin of full cream milk—something we have not seen for many months. Please do believe how very gratefully my sister and I thank you for this valuable and most acceptable gift."

"I have to-day received the parcel. It is a lovely packet of food; I am ever so pleased with it."

"I received the parcel to-day and it is a grand gift for which I am most thankful."

"I received the parcel two days ago and was most grateful and pleased with it."

I know that space in the *Record* is very valuable these days, but trust you can find space for reference to this very generous and thoughtful gift by one of our members.

Yours faithfully,

P. J. Simpson,
Hon. Secretary.
Victoria Veterinary Benevolent Fund,
10, Red Lion Square,
London, W.C.1.
November 10th, 1947.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Oct. 1st to 15th, 1947	4	—	147	—	2	—
Corresponding period in—						
1946	3	—	—	—	—	5
1945	10	2	—	—	6	50
1944	11	14	—	—	6	107
Jan. 1st to Oct. 15th, '47	91	103	1,008	1	66	29
Corresponding period in—						
1946	72	33	—	7	66	331
1945	98	112	—	6	102	803
1944	149	97	—	7	86	1,101

Note.—The figures for the current year are approximate only.
*** Excluding outbreaks in Army Horses.**

Tuberculosis Order of 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period July 1st to September 30th, 1947, was 1,415.